WBA
ARCHITECTURE

22 April 2021

Ridgeland High School | Football Field Turf & Track Replacement
WBA Project No. 5620

ADDENDUM NO. 02

NOTICE TO ALL DOCUMENT HOLDERS:
The following additions, deletions, changes and clarifications to the drawings and specifications are to be included as part of the Contract Documents.

SPECIFICATIONS

ITEM NO.1 **CIVIL SPECIFICATIONS | All**
ADD: The attached civil specifications, in their entirety and as outlined in the index which precedes them as attached, are hereby included at part of the bidding and contract documents.

ITEM NO.1 **SECTION 32.1815 | Outdoor Synthetic Playing Surface**
DELETE Paragraph 5.B.6 in its entirety.

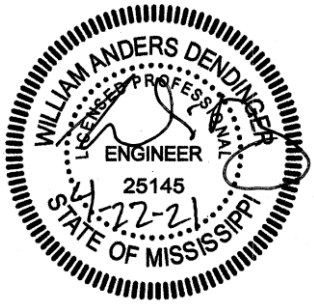
CHANGE Paragraph 7.A.8. The annual aggregate amount is to be reduced from $60 million to $30 million.

ITEM NO. 2 **APPENDIX A | Subsurface Investigation**
ADD: The attached Report of Geotechnical Exploration produced by Burns Cooley Dennis, Inc (dated April 21, 2021) is included in the bid documents for the Contractor's reference. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of the work will be made, with resulting credits or expenditures to the Contract Price/Sum accruing to the Owner.

Encl: Civil Specifications
Report of Geotechnical Exploration produced by Burns Cooley Dennis, Inc (dated April 21, 2021)

cc: All Document Holders
File 0120.C2

2727 Old Canton Rd, Ste 200, Jackson, MS 39216
p 601.321.9107 | wbaarchitecture.com



SECTION 02.1570

Erosion and Sedimentation Control

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Installation of temporary and permanent erosion and sedimentation control systems.

B. Installation of temporary and permanent slope protection systems.

C. Restoration of areas eroded due to insufficient preventive measures.

D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.2 RELATED REQUIREMENTS

A. Section 31.2000 - Earthwork: Temporary and permanent grade changes for erosion control.

1.3 REFERENCE STANDARDS

A. ASTM D4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.

B. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

C. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

D. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

E. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.

F. ASTM D4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.

G. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit.

H. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control; Federal Highway Administration.

I. ASTM D6462 – Standard Practice for Silt Fence Installation

1.4 PERFORMANCE REQUIREMENTS

A. Comply with all requirements of the Mississippi Department of Environmental Quality for erosion and sedimentation control. The sedimentation control measures specified herein are minimum requirements. Additional requirements to meet sediment and erosion control ordinances shall be designed, installed, and maintained by the Contractor. The requirements of the Mississippi Department of Environmental Quality (MDEQ) for managing storm water discharge, the approved Storm Water Pollution Prevention Plan (SWPPP), and the storm water discharge permit for this project (if required by MDEQ) shall apply.

B. Best Management Practices Standard: Federal Highway Administration Best Management Practices for Erosion and Sediment Control.

C. Perform, at a minimum, weekly inspections of all erosion control measures.

D. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.

1. Contractor will obtain permits and pay for securities required by authority having jurisdiction.

2. Owner will withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.

E. Timing: Put preventive measures in place as soon as possible before disturbance of surface cover and before precipitation occurs.

F. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.

1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.

2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.

G. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.

1. Control movement of sediment and soil from temporary stockpiles of soil.

2. Prevent development of ruts due to equipment and vehicular traffic.

3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

H. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.

1. Prevent windblown soil from leaving the project site.

2. Prevent tracking of mud onto public roads outside site.

3. Prevent mud and sediment from flowing onto sidewalks and pavements.

4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

I. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

J. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

K. Open Water: Prevent standing water that could become stagnant.

L. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.5 SUBMITTALS

A. See Section 01.3400 – Shop Drawings, Product Data and Samples, for submittal procedures.

B. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.

C. Inspection Reports: Submit a report of each inspection on a monthly basis and also kept on-site; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished. Inspections shall be performed weekly and a minimum of four inspections per month. Perform all inspections including any additional reporting requirements or reporting periods per Mississippi Department of Environmental Quality requirements. Inspections shall be performed on the MDEQ official inspection form included in the project manual.

D. Maintenance Instructions: Provide instructions covering inspection and maintenance for measures that must remain after Substantial Completion.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Mulch: Use one of the following:

1. Straw or hay.
2. Wood waste, chips, or bark.
3. Erosion control matting or netting.

B. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.

C. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible.

Manufacturers:

a. Silt Stop by American Excelsior Company – Arlington, Texas.
b. Envirofence by Mirafi – Charlotte, North Carolina.
c. Exxon GTF 100S by Exxon – Atlanta, Georgia.

D. Silt Fence Posts: One of the following, minimum 5 feet long:

1. Steel U- or T-section, with minimum mass of 1.33 lb per linear foot.
2. Softwood, 4 by 4 inches in cross section.
3. Hardwood, 2 by 2 inches in cross section.

E. Gravel: See Detail Sheets for aggregate.

F. Loose Rock Riprap and Filter Fabric: The work shall consist of the placement of loose rock riprap including filter cloth meeting the following requirements:

24-inch thick layer of rock riprap:

Cumulative Percent Lighter (By Weight)	Stone Weight (Pounds)	Maximum Diameter	Minimum D_{50} Diameter
100%	200	16.2”	9.5”
50 - 85	80		
15 - 50	40		
0 - 15	10		

The filter cloth shall have an equivalent opening size (EOS) of 0.21 mm (U.S. sieve 70), a flow rate capacity of 100 gal/min/sq ft., a grab elongation of 50%, and a Mullen burst strength of at least 350 psi. Filter fabric meeting the requirements of Type V, Section 714.13 of Mississippi Standard Specifications for Road and Bridge Construction, 1990 Edition, shall be acceptable for use under this specification. The roll width should be at least six feet wide.

G. Concrete: See Section 32.1313.

H. Erosion Control Matting: Rolled erosion control products selected and installed according to Erosion Control

Technology Council (ECTC) standard specifications and manufacturer's recommendations.

I. Straw Wattles: Straw filled tubes made of jute, nylon, or other photo-degradable materials on the contour across the slope. The tubes shall be 9, 12, or 20 inches in diameter filled with compressed, weed-free straw. Straw wattle shall be free of defects and voids that would interfere with proper installation or impair performance and shall be of consistent density with fibers distributed evenly over the entire area of the wattle. The wattles are placed on the contour to intercept water flowing down the slope and trap sediments being moved with the water

J. Erosion Eels: Shall consist of core, internal filter materials comprised of one of two mixtures:

1. Core Material: Shall consist of core, internal filter materials comprised of one of two mixtures:

   a. Mixture Specification 1.0: A filter mixture comprised of 100% shredded rubber that has been washed and processed to remove most, if not all, metal components. The material shall be derived from recycled tires and shall be shredded to produce a maximum particle size of +/- ¾ inch.

   b. Mixture Specification 2.0. A filter mixture comprised of 100% shredded rubber that has been washed and processed to remove most, if not all, metal components. The material shall be derived from recycled tires and shall be shredded to produce a maximum particle size of +/-2-inches.

2. Containment Material: The containment material for the filter core particles shall be a woven, polypropylene geotextile with UV-stabilizers and inert to biological decay and chemically resistant to naturally occurring chemicals, alkalis, and acids. Minimum fabric permeability shall be equal to or greater than 0.05 cm/sec per ASTM D 4491. Minimum strength retained relative to UV exposure shall be 70% when tested per ASTM D 4355 for 500 hours.

3. Size: Erosion Eels shall be produced with a nominal diameter of +/-9.5 inches and +/-20 inches and standard nominal lengths of +/-4.5 feet and +/-10 feet.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

B. Temporaray Seeding or Stabilization: All denuded areas that will be inactive for 14 days or more, must be stabilized temporarily with the use of fast-germinating annual grass/grain varieties appropriate for site soil and climate conditions, straw/hay mulch, wood cellulose fibers, tackifiers, netting and/or blankets. Stockpiles and diversion ditches/berms must be stabilized to prevent erosion and dust issues. The appropriate temporary or permanent vegetative practices shall be implemented within 7 calendar days.

3.2 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

B. Mark off areas of disturbance using flags, fencing and construction tape as necessary to clearly delineate project disturbance limits.

3.3 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Construction Entrances: Traffic-bearing aggregate surface.

1. Width: As required; 20 feet, minimum.

2. Length: 50 feet, minimum.

3. Provide at each construction entrance from public right-of-way.

4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

C. Linear Sediment Barriers: Made of silt fence or Erosion Eels unless shown otherwise on the Erosion Control Plan.

1. Provide linear sediment barriers:

a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.

b. Along the top of the slope or top bank of drainage channels and swales that traverse disturbed areas.

c. Along the toe of cut slopes and fill slopes.

d. Perpendicular to flow across the bottom of existing and new drainage channels and swales that traverse disturbed areas or carry runoff from disturbed areas; space at maximum of 200 feet apart.

e. Across the entrances to culverts that receive runoff from disturbed areas.

2. Space sediment barriers with the maximum slope length upslope from barrier as shown on the plans.

D. Storm Drain Drop Inlet Sediment Traps: Not Used.

E. Soil Stockpiles: Protect using one of the following measures:

1. Cover with polyethylene film, secured by placing soil on outer edges.

2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.

F. Temporary Seeding: Use where temporary vegetated cover is required.

3.4 INSTALLATION

A. Traffic-Bearing Aggregate Surface: See Detail Sheets for additional installation information.

1. Excavate minimum of 6 inches.

2. Place geotextile fabric full width and length, with minimum 12 inch overlap at joints.

3. Place and compact at least 6 inches of MSDOT #1 Coarse Aggregate.

B. Silt Fences: See Detail Sheets for additional installation information.

1. Store and handle fabric in accordance with ASTM D6462.

2. Install with top of fabric at nominal height and embedment as specified and shown on the construction plans.

3. Embed bottom of fabric in a trench on the upslope side of fence, with 8 inches of fabric laid flat on bottom of trench facing upslope; backfill trench and compact.

4. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 72 inches.

5. Fasten fabric to wood posts using one of the following:

a. Four 3/4 inch diameter, 1 inch long, 14 gage nails.

b. Five 17-gage staples with 3/4 inch wide crown and 1/2 inch legs.

6. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.

7. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high

with post spacing not more than 4 feet.

C. Erosion Eels: See Detail Sheets for additional installation information.

1. Install Erosion Eels near the downstream perimeter of a disturbed area to intercept sediment from sheet flow. Incorporate the Erosion Eels into the erosion control measures used to the control sediment on construction sites. Install, align, and locate the Erosion Eels as specified below, as shown on the plans, as direction.

2. Stabilizing/Securing: Secure Erosion Eels in a method adequate to prevent displacement as a result of normal rain events and such that flow is not allowed under the bags.

3. Removal: Remove and reuse Erosion Eels when directed.

D. Mulching Over Large Areas:

1. Dry Straw and Hay: Apply 2-1/2 tons per acre; anchor using dull disc harrow or emulsified asphalt applied using same spraying machine at 100 gallons of water per ton of mulch.

2. Wood Waste: Apply 6 to 9 tons per acre.

3. Erosion Control Matting: Comply with manufacturer's instructions.

E. Mulching Over Small and Medium Areas:

1. Dry Straw and Hay: Apply 4 to 6 inches depth.

2. Wood Waste: Apply 2 to 3 inches depth.

3. Pine Needles: Apply 2 to 3 inches depth.

4. Erosion Control Matting: Comply with manufacturer's instructions.

F. Temporary Seeding:

1. When hydraulic seeder is used, seedbed preparation is not required.

2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.

3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at rate specified by the Landscape Architect.

4. On soils of very low fertility, apply fertilizer at rate and type as specified by landscape architect.

5. Incorporate fertilizer into soil before seeding.

6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep.

7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.

8. Repeat irrigation as required until grass is established.

3.5 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

C. Silt Fences:

1. Promptly replace fabric that deteriorates unless need for fence has passed.

2. Remove silt deposits that exceed one-third of the height of the fence. Do not place sediment on the

downhill side.

3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.
4. Silt fence shall remain in place until fully established vegetation and root systems are present.

D. Erosion Eels:

1. Inspect and maintain the Erosion Eels in good condition. Maintain the integrity of the control, including keeping the bags free of accumulated silt, debris, etc., until permanent erosion control features are in place, or the disturbed area has been adequately stabilized.
2. Stabilize the areas damaged by the removal process using appropriate methods as approved.
3. Repair or replace damaged Erosion Eels as required and as directed.
4. Temporarily remove and replace Erosion Eels as required to facilitate work. Remove sediment and debris when accumulation affects the performance of the devices, after a rain, and when directed.
5. Dispose of sediment and debris at an approved site in a manner that will not contribute to additional siltation.
6. Remove and reuse Erosion Eels once stabilization is achieved.

3.6 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

SECTION 02.4113

Site Demolition

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Selective Demolition of Built Site Elements.

B. Abandonment and Removal of Existing Utilities and Utility Structures.

1.2 RELATED REQUIREMENTS

A. Section 02.1570 - Erosion and Sedimentation Control.

B. Section 31.2000 - Earthwork: Topsoil Removal; Fill Material for Filling Holes, Pits, and Excavations Generated as a Result of Removal Operations.

1.3 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; Current Edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

C. Mississippi Standard Specifications for Road and Bridge Construction, 2017 Edition.

1.4 SUBMITTALS

A. See Section 01.3400 – Shop Drawings, Product Data and Samples, for submittal procedures.

B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.5 PROJECT CONDITIONS

A. Structures to be demolished will be discontinued in use and vacated prior to start of work.

B. Owner assumes no responsibility for condition of structures to be demolished.

C. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as reasonably practical. Variations within structures may occur by Owner's removal and salvage operations prior to start of demolition work.

D. Unless otherwise indicated in contract documents or specified by the Owner, items of salvageable value to Contractor shall be removed from site and structures. Storage or sale of removed items on site will not be permitted and shall not interfere with other work specified.

1.6 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.

1. Minimum of 10 years of documented experience.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Fill Material: As specified in Section 31.2000 – Earthwork

B. Flowable Fill: All flowable fill shall meet the requirements as excavatable material of Section 612 of the Mississippi Standard Specifications for Road and Bridge Construction, 2017 edition.

PART 3 – EXECUTION

3.1 PREPARATION

A. Provide, erect, and maintain erosion control devices, temporary barriers, and security devices at locations

indicated on Construction Drawings.

B. Protect existing landscaping materials, appurtenances, and structures, which are not to be demolished. Repair damage to existing items to remain caused by demolition operations.

C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring as necessary.

D. Mark location of utilities. Protect and maintain in safe and operable condition utilities that are to remain. Prevent interruption of existing utility service to occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing authorities and Owner.

E. Notify adjacent property Owners of work that may affect their property, potential noise, utility outages, or other disruptions. Obtain written permission from adjacent property Owners when demolition equipment will traverse, infringe upon, or limit access to their property. Coordinate notice with Owner.

F. Conform to applicable state and local codes for demolition of structures, safety of adjacent structures, dust control, runoff control, and pollution prevention.

3.2 GENERAL PROCEDURES

A. Conduct demolition to minimize interference with adjacent structures or pavements to remain. Protect existing structures and other elements that are not to be removed.

1. Provide bracing and shoring.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if any movement of adjacent structures is experienced or if adjacent structures appear to be in danger.

B. Cease operations immediately if adjacent structures appear to be in danger. Notify authority having jurisdiction. Do not resume operations until directed by authority.

C. Sprinkle work with water to minimize dust. Provide hoses and water connections for this purpose. Do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

D. Comply with governing regulations pertaining to environmental protection.

E. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to start of work.

F. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.

1. Obtain required permits.
2. Comply with applicable requirements of NFPA 241.
3. Use of explosives is not permitted.
4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
5. Provide, erect, and maintain temporary barriers and security devices.
6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
8. Do not close or obstruct roadways or sidewalks without permit.
9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

10. Obtain written permission from Owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

G. Do not begin removal until receipt of notification to proceed from Owner.

H. Do not begin removal until built elements to be salvaged or relocated have been removed.

I. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.

J. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB'S, and mercury.

K. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.

L. Perform demolition in a manner that maximizes salvage and recycling of materials.

1. Dismantle existing construction and separate materials.

2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

M. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.3 DEMOLITION

A. Demolish site improvements designated to be removed as shown on the Drawings. Site improvements shall include but not be limited to structures, retaining walls, foundations, pavements, curbs and gutters, drainage structures, utilities, signage or landscaping.

B. Disconnect and cap or remove utilities to be abandoned as shown on the Drawings.

C. Fill or remove underground tanks, piping, and appurtenances as shown.

D. Demolish buildings completely and remove from site using methods as required to complete work within limitations of governing regulations. Small structures may be removed intact when acceptable to Owner and authorities having jurisdiction.

E. Locate demolition equipment and remove materials to prevent excessive loading to supporting walls, floors, or framing.

F. Demolish concrete and masonry in small sections. Break up concrete slabs on grade that are 2-feet or more below proposed subgrade to permit moisture drainage. Remove slabs-on-grade and below grade construction within 2-feet of proposed subgrade.

G. Asphalt and PCC concrete pavements shall be demolished to the subgrade. The subgrade shall be repaired per the Geotechnical Report and Earthwork Specification 31.2000 prior to beginning new paving operations. Demolished pavement shall be disposed of offsite in a manner acceptable to the Owner and authorities having jurisdiction.

3.4 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner and approval from the Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner and approval from the Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

I. Where the contract Drawings indicate a pipe is to be removed from a structure (or demolished), the remaining opening in the structure to remain shall be repaired with 4000 psi non-shrink grout to match the thickness of the structure.

J. Where the contract Drawings indicate complete demolition of a pipe, manhole or drainage structure, the Contractor shall remove the pipe or structure in its entirety and plug or reconnect any remaining pipes as indicated. The Contractor shall not plug any utilities that are to remain in service during or after construction activities are completed. Filling shall be performed in accordance with Section 31.2000 Earthwork.

3.5 FILLING BASEMENTS AND VOIDS

A. Completely fill below grade areas and voids resulting from demolition or removal of structures, underground fuel storage tanks, wells, cisterns, etc., using select fill materials free from debris, trash, frozen materials, roots, and other organic matter.

B. Areas to be filled shall be free of standing water, frost, frozen or unsuitable material, trash, and debris prior to fill placement.

C. Place fill materials in accordance with Section 31.2000 unless subsequent excavation for new work is required.

D. Grade surface to match adjacent grades and to provide flow of surface drainage after fill placement and compaction.

3.6 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. No burning of any material, debris, or trash on site or off site will be allowed except when allowed by appropriate governing authority and Owner. If allowed as stated above, burning shall be performed in manner prescribed by governing authority. Attend burning materials until fires have burned out and have been completely extinguished.

C. Remove from site all materials not to be reused on site; transport materials removed from demolished items with appropriate vehicles and dispose off-site to areas that are approved for disposal by governing authorities and appropriate property Owners.

D. Leave site in clean condition, ready for subsequent work.

E. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03.1000

Concrete Forms and Accessories

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Formwork for cast-in place concrete.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.2 RELATED REQUIREMENTS

A. Section 03.2000 – Concrete Reinforcement.

B. Section 32.1313 – Concrete Paving and Sidewalks.

1.3 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2006.

B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute; 2005.

C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute; 2005.

D. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute; 2004.

E. PS 1 - Structural Plywood; 2007.

1.4 SUBMITTALS

A. See Section 01.3300 – Submittal Procedures.

B. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

1.5 QUALITY ASSURANCE

A. Designer Qualifications: Design formwork under direct supervision of a Professional Engineer experienced in design of concrete formwork and licensed in the State in which the Project is located. Required for all formwork providing structural support for concrete during placement. Not required for grade beams which are part of slab-on-grade foundation.

PART 2 - PRODUCTS

2.1 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

D. Comply with relevant portions of ACI 347, ACI 301, and ACI 318.

2.2 WOOD FORM MATERIALS

A. Softwood Plywood: PS 1, C Grade, Group 2.

2.3 FORMWORK ACCESSORIES

A. Form Release Agent: Colorless mineral oil that will not stain concrete.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Align joints and make watertight. Keep form joints to a minimum.

D. Obtain approval before framing openings in structural members that are not indicated on drawings.

E. Coordinate this section with other sections of work that require attachment of components to formwork.

3.3 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.4 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.5 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

3.6 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117.

3.7 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design,

and to verify that supports, fastenings, wedges, ties, and items are secure.

B. Do not reuse wood formwork more than 3 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.8 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 03.2000

Concrete Reinforcement

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.2 RELATED REQUIREMENTS

A. Section 03.1000 – Concrete Forms and Accessories.

B. Section 32.1313 – Concrete Paving and Sidewalks.

1.3 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2005.

B. ACI 318 - Building Code Requirements For Structural Concrete and Commentary; American Concrete Institute International; 2005.

C. ACI SP-66 - ACI Detailing Manual; American Concrete Institute International; 2004.

D. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2007.

E. CRSI (DA4) - Manual of Standard Practice; Concrete Reinforcing Steel Institute; 2001.

1.4 SUBMITTALS

A. See Section 01.3300 – Submittal Procedures.

B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.5 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301.

PART 2 - PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615 Grade 60.

B. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.2 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

B. Welding of reinforcement is not permitted.

C. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Conform to applicable code for concrete cover over reinforcement.

END OF SECTION

SECTION 31.2000
Earthwork

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Excavation, Filling, and Backfilling for Site, Structures, and Pavement.

B. Trenching and Backfilling for Utilities.

C. Dewatering.

D. Boring Under Crossings.

1.2 RELATED REQUIREMENTS

A. Section 02.1570 – Erosion and Sedimentation Control.

B. Section 02.4113 – Site Demolition

D. Geotechnical Report: Geotechnical Exploration Football Field Improvements Ridgeland High School by Burns Cooley Dennis, Inc, dated April 21, 2021.

1.3 DEFINITIONS

A. Satisfactory Materials: Select, nonorganic and debris-free silty clays with ASTM D2487 Soil Classification Group CL with not less than 70 percent fines passing the No. 200 sieve.

1. Fill material shall further conform to the plasticity index and liquid limits (PI and LL) specified in paragraph filling hereinafter.

2. Satisfactory materials shall be free of rock or gravel larger than allowed for fill or backfill material as specified hereinafter or as shown on the drawings.

3. Satisfactory materials shall contain no debris, waste, frozen materials, vegetation, and other deleterious matter.

4. Unless specifically stated otherwise on the drawings, the following table stipulates maximum allowable values for plasticity index (PI) and liquid limit (LL) of satisfactory materials to be used as fill in specified areas:

Location	PI	LL
All Areas	$10 \leq PI \leq 24$	Less Than 45

B. Unsatisfactory Materials: Materials which do not comply with the requirements for satisfactory materials are unsatisfactory.

1. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory materials which contains root and other organic matter or frozen material. The Architect shall be notified of any contaminated materials.

2. Unsatisfactory materials also include satisfactory materials not maintained within 3 percent of optimum moisture content at time of compaction.

C. Finish Grade Elevations: Indicated on drawings.

D. Subgrade Elevations: 4 inches below finish grade elevations indicated on drawings, unless otherwise indicated.

1.4 REFERENCE STANDARDS

A. ASTM International (ASTM)

1. ASTM D422 – Particle Size Analysis of Soil.

2. ASTM D698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 FT-LBF/FT^3).
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 FT-LBF/FT^3).
4. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
5. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
6. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
7. ASTM D2321-89 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

B. American Association of State Highway and Transportation Officials (AASHTO)

1. AASHTO T 88 – Particle Size Analysis of Soils.

C. State Department of Transportation (DOT)

1. State of Mississippi Standard Specifications for Road and Bridge Construction, 2017 Edition.

1.5 SUBMITTALS

A. See Section 01.3400 – Shop Drawings, Product Data and Samples, for submittal procedures.

B. Samples: 10 lb sample of each type of off-site fill material that is to be used at the site; submit in air-tight containers to testing laboratory or submit gradation and certification of aggregate material that is to be used at the site to the independent testing laboratory for review.

C. Materials Sources: Submit name of each material supplier and specific type and source of each material.

D. Material Sources: Submit gradation and certification of aggregate material that is to be used for trench bedding, haunching, and initial and final backfill for all utility and storm sewer installations to the engineer for review.

E. Shop drawings or details pertaining to excavating and filling are not required unless otherwise shown on the drawings or if contrary procedures to construction documents are proposed.

F. Shop drawings or details pertaining to site utilities are not required unless required by regulatory authorities or unless uses of materials, methods, equipment, or procedures that are contrary to the drawings or specifications are proposed. Do not perform work until the Owner has accepted the required shop drawings.

G. Contact utility companies and determine if additional easements will be required to complete project. Provide written confirmation of the status of all easements to the Owner at commencement of construction or no later than 90 days prior to project completion date.

1.6 QUALITY ASSURANCE

A. Perform work in accordance with state of Mississippi Highway Department Standards.

B. Laboratory testing of materials proposed for use in the project shall be by the contractor's construction testing laboratory at no cost to the Owner. The contractor shall provide samples of material obtained off-site.

C. Following tests shall be performed on each type of on site or imported soil material used as compacted fill:

1. Moisture and Density Relationship: ASTM D698 or ASTM D1557.
2. Mechanical Analysis: AASHTO T88 or ASTM D422.

3. Plasticity Index: ASTM D4318.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Fill and Backfill: Satisfactory materials excavated from the site.

B. Imported Fill Material: Satisfactory materials provided from offsite borrow areas when sufficient materials are not available from required excavations and onsite borrow areas.

C. Trench Backfill: Satisfactory materials provided from offsite borrow areas when sufficient materials are not available from required excavations and onsite borrow areas.

D. Bedding and Haunching: Bedding and haunching material shall be excavatable flowable fill as specified by section 612 of the Mississippi Standard Specifications for Road and Bridge Construction, 2017 edition. Crushed sand or stone shall not be used as bedding or haunching material on this project.

E. Drainage Fill: Not Used.

F. Topsoil: Topsoil shall consist of stripping material excavated from the site or approved imported topsoil material. Topsoil shall consist of organic surficial soil found in depth of not more than the upper 4 inches. ASTM D5268 material, free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds, foreign matter, hazardous or toxic substances, and deleterious materials that may be harmful to plant growth, or hinder grading, planting or maintenance. Topsoil shall contain a minimum of five percent (5%) organic material.

1. Acidity range (PH) of 5.5 TO 7.5.
2. Containing a minimum of 4 percent and a maximum of 25 percent inorganic material.
3. Conforming to ASTM D2487 group symbol OH.
4. Limit decaying matter to 3 percent of total content by volume.

2.2 APPURTENANT MATERIALS

A. Geotextile fabric for stabilization:

1. MIRAFI HP 370 or HP 570, by Tencate.
2. SF40 or SF65, by Dupont.
3. GTF-200 or 300, by Thrace-LINQ.

B. Filter And Drainage Fabrics: See plans and details for specific geotextile fabric requirements.

C. Trench Utility Locator Tape: Heavy duty 6" wide underground warning tape. Tape shall be made from polyethylene material, 3.5 mils thick, with a minimum tensile strength of 1,750 psi. Place the tape at one-half the minimum depth of cover for the utility line or a maximum of 3 feet, whichever is the less, but never above the top of subgrade. Color of tape shall be determined by as follows:

1. Natural gas or propane – yellow. Additional tracer wire required
2. Electric – red.
3. Telephone – orange.
4. Water – blue. Additional tracer wire required; see Site Water Utility Distribution Piping Specification Section 33.1116
5. Sanitary sewer – green. Additional tracer wire required; see Site Sanitary Utility Sewerage Piping specification Section 33.3111.

2.3 EQUIPMENT

A. Transport off site materials to project using well-maintained and operating vehicles. Once on site, transporting vehicles shall stay on designated haul roads and shall at no time endanger improvements by rutting, overloading, or pumping.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.2 PREPARATION

A. Identify required lines, levels, contours, datum, and grades necessary for construction are as shown on the drawings.

B. Locate, identify, and protect from damage above and below grade utilities to remain.

C. Notify utility company to remove and relocate public utilities (or private utilities in which the municipality is required to perform the work to relocate said utility) that are in conflict with proposed improvements.

D. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by licensed land surveyor and replaced, as necessary, by same.

E. Protect site features including, but not limited to, fences, existing structures, sidewalks, paving, and curbs, unless otherwise noted on the drawings from excavating equipment and vehicular traffic.

F. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.

G. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

H. Remove from site, material encountered in grading operations that, in opinion of Owner or the Owner's construction testing laboratory (CTL) is unsatisfactory material or undesirable for backfilling, subgrade, or foundation purposes. Dispose of in manner satisfactory to Owner and local governing agencies. Backfill areas with layers of satisfactory material and compact as specified herein.

I. Prior to placing fill in low areas, such as previously existing creeks, ponds, or lakes, perform following procedures:

1. Drain water out by gravity with ditch having flow line lower than lowest elevation in low area. If drainage cannot be performed by gravity ditch, use adequate pump to obtain the same results.

2. After drainage of low area is complete, remove muck, mud, debris, and other unsatisfactory material by using acceptable equipment and methods that will keep natural soils underlying low area dry and undisturbed.

3. All muck, mud, and other materials removed from low areas shall be dried on site by spreading in thin layers for observation by the CTL. Material shall be inspected and, if found to be satisfactory for use as fill material, shall be incorporated into lowest elevation of site filling operation, but not under building subgrade or within 5'-0" of perimeter of building subgrade, paving or outparcel subgrade. If, after observation by the CTL, material is found to be unsatisfactory, it shall be removed from site.

J. Maintain in operating condition existing utilities, previously installed utilities, and drainage systems encountered in utility installation. Repair surface or subsurface improvements shown on the drawings.

K. Verify location, size, elevation, and other pertinent data required making connections to existing utilities and drainage systems as indicated on the drawings.

L. Over excavate and properly prepare areas of subgrade that are not capable of supporting proposed systems. Stabilize these areas by using acceptable geotextile fabrics or aggregate material placed and compacted as specified.

3.3 DEWATERING

A. General:

1. Dewatering activities shall conform to applicable provisions in the erosion and sedimentation control specification.
2. Provide dewatering systems as required for excavations.
3. Design and provide dewatering system using accepted and professional methods consistent with current industry practice to eliminate water entering the excavation under hydrostatic head from the bottom or sides. Design system to prevent differential hydrostatic head, which would result in floating out soil particles in a manner, termed as a "quick" or "boiling" condition. System shall not be dependent solely upon sumps or pumping water from within the excavation where differential head would result in a quick condition, which would continue to worsen the integrity of the excavation's stability.
4. Provide dewatering system of sufficient size and capacity to prevent ground and surface water flow into the excavation and to allow work to be installed in a dry condition.
5. Control, by acceptable means, all water regardless of source. Contractor shall be responsible for disposal of the water.
6. Control groundwater in a manner that preserves strength of foundation soils, does not cause instability or raveling of excavation slopes, and does not result in damage to existing structures. Where necessary, lower water level in advance of excavation utilizing wells, wellpoints, jet educators, or similar positive methods. The water level as measured by piezometers shall be maintained a minimum of 3 feet below prevailing excavation level.
7. Commence dewatering prior to any appearance of water in excavation and continue until work is complete to the extent that no damage results from hydrostatic pressure, flotation, or other causes.
8. Open pumping with sumps and ditches will be allowed provided it does not result in boils, loss of fines, softening of the ground, or instability of slopes.
9. Install wells or wellpoints, if required, with suitable screens and filters so that continuous pumping of fines does not occur. Arrange discharge to facilitate collection of samples. During normal pumping and upon development of wells, levels of fine sand or silt in the discharge water shall not exceed 5 ppm. Install sand tester on discharge of each pump during testing to verify that levels are not exceeded.
10. Control grading around excavations to prevent surface water from flowing into excavation areas.
11. No additional payment will be made for any supplemental measures to control seepage, groundwater, or artesian head.

B. Design:

1. Designate and obtain the services of a qualified dewatering specialist to provide dewatering plan as may be necessary to complete the work.
2. Contractor shall be responsible for the accuracy of the drawings, design data, and operational records required.
3. Contractor shall be responsible for the design, installation, operation, maintenance, and any failure of any component of the system.

C. Damages:

1. Contractor shall be responsible for and shall repair any damage to work in place, other contractor's equipment, utilities, residences, highways, roads, railroads, private and municipal well systems, adjacent structures, natural resources, habitat, existing wells, and the excavation. Contractor responsibility shall

also include, damage to the bottom due to heave and including but not limited to, removal and pumping out of the excavated area that may result from contractor's negligence, inadequate or improper design and operation of the dewatering system, and any mechanical or electrical failure of the dewatering system.

2. Remove subgrade materials rendered unsatisfactory by excessive wetting and replace with approved backfill material at no additional cost to the Owner.

D. Maintaining excavation in dewatering condition:

1. Dewatering shall be a continuous operation. Interruptions due to power outages or any other reason will not be permitted.

2. Continuously maintain excavation in a dry condition with positive dewatering methods during preparation of subgrade, installation of pipe, and construction of structures until the critical period of construction or backfill is completed to prevent damage of subgrade support, piping, structure, side slopes, or adjacent facilities from flotation or other hydrostatic pressure imbalance.

3. Provide standby equipment on site, installed, wired, and available for immediate operation if required to maintain dewatering on a continuous basis in the event any part of the system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, perform such work as may be required to restore damaged structures and foundation soils at no additional cost to Owner.

4. System maintenance shall include but not be limited to 24-hour supervision by personnel skilled in the operation, maintenance, and replacement of system components and any other work required to maintain excavation in dewatered condition.

E. System Removal: Upon completion of the work, remove dewatering equipment from the site, including related temporary electrical service.

F. Wells shall be removed or cut off a minimum of 3 feet below final ground surface, capped, and abandoned in accordance with regulations by agencies having jurisdiction.

3.4 TOPSOIL EXCAVATION

A. Cut heavy growths of grass from areas before stripping and remove cuttings with remainder of cleared vegetative material.

B. Strip topsoil to a depth of not less than 12 inches from areas that are to be filled, excavated, landscaped, or re graded to such depth that it prevents intermingling with underlying subsoil or questionable material.

C. Stockpile topsoil in storage piles in areas shown on the drawings or where directed by Owner. Construct storage piles to freely drain surface water. Cover storage piles as required to prevent windblown dust. Dispose of unsuitable topsoil as specified for waste material, unless otherwise specified by Owner. Remove excess topsoil from site unless specifically noted otherwise on the drawings.

3.5 EXCAVATION

A. Field Excavation: excavate to accommodate new playing surface and construction operations. Excavate football field areas to line and grade as shown on the drawings being careful not to over excavate beyond elevations needed for building subgrades. The bottom of the exaction should be sloped to drain at about a 0.5% slope to provide drainage of the excavation if needed where applicable. The placement and compaction of backfill soils should be performed in accordance with the recommendations mentioned in the geotechnical report.

B. Notify Architect of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

C. When performing grading operations during periods of wet weather, provide adequate dewatering, drainage and ground water management to control moisture of soils. Grade top perimeter of excavation to prevent

surface water from draining into excavation.

D. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

E. Do not interfere with 45 degree bearing splay of foundations.

F. Cut utility trenches wide enough to allow inspection of installed utilities.

G. Hand trim excavations. Remove loose matter.

H. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see filling paragraph.

I. Place satisfactory excavated material into project fill areas

J. Remove excess excavated material and excavated material that is unsuitable for re-use from site and dispose of in manner and location that is acceptable to the Architect and local governing agencies.

K. Perform excavation using capable, well-maintained equipment and methods acceptable to the Architect and local governing agencies.

L. All pipes that penetrate levees, including permanent outlet control devices and temporary discharge pipes from sedimentation ponds, shall be constructed in conjunction with fill placement to ensure these drainage devices are properly placed and the surrounding backfill is adequately tied to the basin levee. Trenching of levees is not permitted. All materials in the levee, including bedding materials for the discharge devices, shall be low permeability, cohesive soils. Soil exhibiting high shrink/swell potential or containing greater than 5% organics shall not be used.

3.6 ROCK EXCAVATION

A. Not Used.

3.7 TRENCH EXCAVATION FOR UTILITIES

A. Contact local utility companies before excavation begins. Cut utility trenches wide enough to allow inspection of installed utilities. Dig trench at proper width and depth for laying pipe, conduit, or cable. Cut trench banks vertical, if possible, and remove stones and other hard matter from bottom of trench as necessary to avoid point bearing on pipe. Over-excavate wet or unstable soil, if encountered, from trench bottom as necessary to provide suitable base for continuous and uniform bedding. Replace over-excavation with satisfactory material and dispose of unsatisfactory material.

B. Notify Architect of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Perform trench excavation as indicated on the drawings for specified depths. During excavation, stockpile materials suitable for backfilling in orderly manner far enough from bank of trench to avoid overloading, slides, or cave-ins.

F. Remove excavated materials not required or not satisfactory as backfill or embankments and waste offsite or at onsite locations approved by the Owner and in accordance with governing regulations. Dispose of structures discovered during excavation as specified in Section 02.4113.

G. Hand trim excavations. Remove loose matter.

H. Prevent surface water from flowing into trenches or other excavations by temporary grading or other methods, as required. Remove accumulated water in trenches and other excavations as specified.

I. Open cut excavation with trenching machine or backhoe. Where machines other than ladder or wheel type trenching machines are used, do not use clods for backfill.

J. Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on bedding material at every point along entire length except where necessary to excavate for bell holes, proper sealing of pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer, or wider than needed to make joint connection properly.

K. Trench width below top of pipe shall not be less than 12 inches nor more than 18 inches wider than outside surface of pipe or conduit that is to be installed to designated elevations and grades. Other trench width for pipe, conduit, or cable shall be least practical width that will allow for proper compaction of trench backfill.

L. Trench depth requirements measured from finished grade or paved surface shall meet the following requirements or applicable codes and ordinances, whichever is more stringent:

1. Water Mains: 36 inches to top of pipe barrel or 6 inches below frost line, established by local building official, whichever is deeper.

2. Sanitary Sewer: Elevations and grades as indicated on the drawings and as specified in Section 33.3111.

3. Storm Sewer: Elevations and grades as indicated on the drawings.

4. Electrical Conduits: 24 inches minimum to top of conduit or as required by NEC 300 5, NEC 710 36 Codes, or local utility company requirements, whichever is deeper.

5. TV Conduits: 18 inches minimum to top of conduit or as required by local utility company, whichever is deeper.

6. Telephone Conduits: 18 inches minimum to top of conduit, or as required by local utility company, whichever is deeper.

7. Gas Mains and Service: 36 inches minimum to top of pipe, or as required by local utility company, whichever is deeper.

3.8 SUBGRADE PREPARATION/ROUGH GRADING

A. Scarification and Compaction: Areas exposed by excavation or stripping and on which subgrade preparations are to be performed shall be scarified to minimum depth of 9 inches and compacted as specified hereinafter.

B. Proofrolling: Subgrades shall be proofrolled to detect areas of insufficient compaction and soft pocket, or areas of excess yielding. Proofrolling shall be accomplished by making minimum of 2 overlapped, complete passes with fully loaded tandem axle dump truck with a minimum weight of 10 tons but not exceeding 25 tons, or approved equal, in each of 2 perpendicular directions while under the supervision and direction of the construction testing laboratory. Limit vehicle speed to 3 mph. Areas of failure such as soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by the CTL, shall be marked and documented. Any unstable conditions must be mitigated. Continual failure areas shall be stabilized as required by the geotechnical engineer no additional cost to Owner.

C. Hand Auger Probing: In small areas where proof rolling is not practical, hand auger probing may be necessary in lieu of proofrolling to ensure the subgrade soils are well compacted, stable and unyielding prior to placing fill or constructing improvements above those soils. Hand auger probing in these areas shall consist of shallow hand auger borings to penetrate any disturbed portions of the subgrade and then using DCP testing, steel probe testing or other testing procedures, as approved by the CTL, necessary to ensure the subgrade is stable, unyielding and exhibits a minimum CBR value of 5 prior to placing new stone base and pavements. Retesting of the subgrade will be required if the new stone base and pavements are not placed within the time limits outlined in the specifications or if the subgrade is subjected to unfavorable weather conditions.

D. Benching Slopes: Horizontally bench existing slopes greater than 1:6 to key fill material to slope for firm bearing.

E. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill. Cut out soft areas of subgrade not capable of compaction in place. Backfill with approved fill. Reference the Geotechnical Report and Construction Drawings for specific buffer and/or undercut requirements.

F. Construct temporary ditches and perform such grading as necessary to maintain positive drainage away from subgrade at all times.

3.9 FILLING

A. Fill to contours and elevations shown on the drawings using materials deemed satisfactory.

B. Fill up to subgrade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Soil Fill: Place and compact material in equal continuous layers not exceeding 9 inches loose depth and compacted as specified hereinafter.

G. Material imported from off-site shall have CBR value equal to or above pavement design subgrade CBR value recommended by the Geotechnical Engineer. In the absence of this information the Contractor shall contact the Geotechnical Engineer for approved materials.

H. Slope grade away from building to match the construction drawings, but no less than a minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

I. Correct areas that are over-excavated.

1. All areas: Use select fill, flush to required elevation, compacted to 95 percent of maximum dry density.

J. Compaction density shall be not less than 95 percent of standard proctor maximum dry density (ASTM D698) at moisture contents within 3 percentage points of the optimum water content.

K. Reshape and re-compact fills subjected to vehicular traffic.

L. Field preparation area shall be that portion of site directly beneath and adjacent to the track and field, as shown on the drawings. All fill material shall be placed in loose lifts that are graded to provide a uniform loose lift thickness not exceeding 9 inches prior to compaction. The surface of each preceding, compact lift shall be stable, free from movement or pumping prior to the placement of the subsequent lift. The preceding lift shall be lightly scarified immediately prior to the placement of the next lift to ensure adequate bonding between lifts. During compaction, the moisture content of the fill material should be maintained within ±3% of the optimum moisture content as determined by the standard effort compaction test (ASTM D 698).

M. All fill material placed for this project shall be compacted to at least 95% of the maximum dry density as determined by the standard effort compaction test (ASTM D 698). Each lift of fill material should be placed and compacted with the moisture content within the range recommended above and with stability present. Stability is defined as the absence of pumping or movement in the lift.

3.10 ROCK FILL

A. Not Used.

3.11 PIPE BEDDING

A. Excavate trenches for pipe or conduit to 4 inches below bottom of pipe and to the width as specified herein. Place 4 inches of bedding material, compact in bottom of trench, and shape to conform to lower portion of pipe barrel.

B. Place geotextile fabric as specified on the Drawings and in accordance with the manufacturer's recommendations.

3.12 TRENCH BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials. Materials used for trench backfill shall comply with requirements as specified as satisfactory fill materials in the geotechnical report and as shown in the contract documents.

B. Backfill and compact in accordance with fill and compaction requirements in ASTM D2321 unless otherwise shown on the drawings.

C. Do not backfill trenches until required tests are performed and utility systems comply with and are accepted by applicable governing authorities.

D. Fill up to subgrade elevations unless otherwise indicated.

E. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

F. Maintain optimum moisture content of fill materials to attain required compaction density.

G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

H. Reshape and re-compact fills subjected to vehicular traffic.

3.13 BORINGS AND CASINGS UNDER ROADS, HIGHWAYS, AND RAILROAD CROSSINGS

A. When indicated by the drawings, street, road, highway, or railroad crossings for utility mains installed by bore and jack method shall be in accordance with area specifications and governing authorities.

B. Excavation of approach pits and trenches within right of way of street, road, highway, or railroad shall be of sufficient distance from paving or railroad tracks to permit traffic to pass without interference. Tamp backfill for approach pits and trenches within right of way in layers not greater than 6-inches thick for entire length and depth of trench or pit. Compact backfill to 95 percent of maximum dry density in accordance with ASTM D698 obtained at optimum moisture as determined by AASHTO T180. Mechanical tampers may be used after cover of 6 inches has been obtained over top of barrel of pipe.

C. Accomplish boring operation using commercial type boring rig. Bore hole to proper alignment and grade. Bore hole shall be within 2 inches of same diameter as largest outside joint diameter of pipe installed. Install pipe in hole immediately after bore has been made and in no instance shall hole be left unattended while open.

D. In event subsurface operations result in failure or damage to pavement or railroad tracks within 1 year of construction, make necessary repairs to pavement or railroad tracks at no additional cost to the Owner. If paving cracks on either side of pipe line or is otherwise disturbed or broken due to construction operations, repair or replace disturbed or broken area.

E. Butt weld steel casing: Welds shall be full penetration single butt welds in accordance with AWWA C206.

F. Install casing and utility pipe with casing spacers, end seals, vent pipe (where applicable), and other special equipment in accordance with area specifications and governing authorities.

3.14 COMPACTION

A. Compact as follows: Percent of Maximum Laboratory Density

Location	ASTM D698
All Locations	95

B. Maintain moisture content of not less than 3 percent below and not more than 3 percent above optimum moisture content of fill materials to attain required compaction density.

C. Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.

D. Corrective Measures For Non-Complying Compaction: Remove and re-compact deficient areas until proper compaction is obtained. Continual failure areas shall be stabilized in accordance with section the Geotechnical Report at no additional cost to Owner.

3.15 MAINTENANCE OF SUBGRADE

A. Verify finished subgrades to ensure proper elevation and conditions for construction above subgrade.

B. Protect subgrade from excessive wheel loading during construction, including concrete trucks, dump trucks, and other construction equipment. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 6 inches and compact to not less than 95% standard proctor density (ASTM D698).

C. Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in manner that will comply with compaction requirements by use of material with CBR equal to or better than that specified on the drawings. Surface of subgrade after compaction shall be firm, uniform, smooth, stable, and true to grade and cross section.

D. Construct temporary ditches and perform such grading as necessary to maintain positive drainage away from subgrade at all times.

3.16 BORROW AND SPOIL SITES

A. Comply with NPDES and local erosion control permitting requirements for any and all on-site and off-site, disturbed spoil and borrow areas. Upon completion of spoil or borrow operations, clean up spoil or borrow areas in a neat and reasonable manner to the satisfaction of Owner or off-site property Owner, if applicable.

3.17 FINISH GRADING

A. Before Finish Grading:

1. Verify all backfilling has been inspected. Check grading of subgrades by string line from grade stakes (blue tops) set at not more than 50-foot centers. Allowable tolerance shall be plus or minus 0.08 feet from plan grade. Provide engineering and field staking as necessary for verification of lines, grades, and elevations.

2. Verify finished subgrade to ensure proper elevation and conditions for construction above subgrade.

3. Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in manner that will comply with compaction requirements by use of material equal to or better than that specified on the drawings. Graded areas shall be uniform and smooth, free from rock, debris, or irregular surface changes, stable, and true to grade and cross section

B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.

C. Grade areas where finish grade elevations or contours are indicated on the drawings, other than paved areas and buildings, including excavated areas, filled and transition areas, and landscaped areas. Ground surfaces shall vary uniformly between indicated elevations. Grade finished ditches and swales to allow for proper drainage without ponding and in manner that will minimize erosion potential.

3.18 TOPSOIL PLACEMENT

A. Place topsoil where required to level finish grade.

B. Place topsoil to the following compacted thicknesses:

1. Areas to be seeded with grass: 6 inches.

2. Areas to be sodded: 4 inches.

3. Shrub beds: 18 inches.

4. Flower beds: 12 inches.

C. Place topsoil during dry weather.

D. Remove roots, weeds, rocks, and foreign material while spreading.

E. Near plants spread topsoil manually to prevent damage.

F. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

G. Lightly compact placed topsoil.

3.19 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.20 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and And Site Features to Remain: If damaged due to this work, repair or replace to original condition.

B. Trees To Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect as to remedy.

C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

D. Correct settled and eroded areas within 1 year after date of completion at no additional expense to Owner. Bring grades to proper elevation.

3.21 FIELD QUALITY CONTROL, TESTING AND INSPECTION

A. Responsibilities: Unless otherwise specified, the quality control testing and inspection specified below will be conducted by the Owner's Construction Testing Laboratory (CTL) at no cost to the Contractor. The contractor shall perform additional quality control testing and inspections as considered necessary.

B. Field testing, frequency, and methods may vary as determined by and between the Owner and the CTL.

C. Work shall be performed by a special inspector – technical I unless specified otherwise. Report of testing and inspection results shall be made upon the completion of testing.

D. Classification of Materials: Perform test for classification of materials used and encountered during construction in accordance with ASTM D2488 and ASTM D2487.

E. Laboratory Testing of Materials: Any onsite fill materials or imported fill materials to be used shall be tested to determine: Atterberg limits, gradation or percent fines in accordance with ASTM D422 and ASTM D1140. Additionally perform standard effort laboratory compaction proctor testing in accordance with ASTM D698.

F. Proofrolling: Document and explain proofrolling inspection procedures and results in the laboratory inspection report.

G. Field Density Tests

1. In cut and fill areas, not less than 1 compaction test per lift for every 2,500 sq. ft of surface area or portion therof. In fill areas, same rate of testing for every other 8-inch lift, measured loose. Testing shall be performed at a minimum 3 tests per every other lift.

2. Bedding, Haunching, And Initial and Final Backfill for Utility and Storm Sewer Trenches: Intervals not exceeding 200-feet of trench for first and every other 4 to 6 inch lifts of compacted trench backfill.

3. Test Method: In-place nuclear density, ASTM D6938.

5. Density tests on top of building or paving subgrade shall be performed within 48 hours prior to placement of overlying materials. If inclement weather occurs after testing, retest prior to placement of overlying materials.

H. Observation

1. To minimize the amount of excavation and undercutting, a representative of the geotechnical engineer, shall be present during earthwork operations to evaluate the stability of the soils exposed after stripping and undercutting.

2. Observe all subgrades/excavation bases below footings and slabs and verify design bearing capacity is achieved as required. Work shall be performed by a representative of the geotechnical engineer.

2. Observe and document presence of groundwater within excavations. All possible sources of water shall be evaluated during construction. All underground utilities shall be monitored and inspected to check for groundwater; specifically the storm pipe adjacent to the running track and the underground electrical power conduits that cross the football field.

3. Overexcavation and backfill of building pad – once excavation grade is achieved, the bottom of the excavation should be visually observed by a representative of the geotechnical engineer for soft, wet, or unstable areas. The bottom of the excavation shall then be profroolled in accordance with Section 3.03 B. Proofrolling of this specification.

4. All observations shall be performed and documented by the CTL.

3.22 CLEANING

A. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 32.1216

Asphalt Paving

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Aggregate Base Course.

B. Single Course Bituminous Concrete Paving.

C. Double Course Bituminous Concrete Paving.

1.2 RELATED REQUIREMENTS

A. Section 31.2000 - Earthwork

1.3 REFERENCE STANDARDS

A. AI (Asphalt Institute) MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types; The Asphalt Institute; 1994.

B. AI MS-19 - A Basic Asphalt Emulsion Manual; The Asphalt Institute; Third Edition.

C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009A.

D. AASHTO M320 - Performance-Graded Asphalt Binder

E. Mississippi Standard Specifications for Road and Bridge Construction, 1990 Edition.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with State of Mississippi Highway's Standard.

B. Mixing Plant: Conform to requirements of Mississippi Standard Specifications for Road and Bridge Construction, latest edition.

C. Obtain materials from same source throughout.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code for paving work on public property.

1.6 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

B. Place bitumen mixture when temperature is not more than 15 F degrees below bitumen supplier's bill of lading and not more than maximum specified temperature.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Asphalt Cement: Shall meet ASTM D946. Asphalt binder shall be a performance-graded (PG) binder, meeting the requirements of AASHTO M320, which is appropriate for the climate and traffic-loading conditions at the site of the paving project and in compliance with the local state highway department specifications for that location, or as specified by the Contract Documents.

B. Aggregate for Base Course: In accordance with the 1990 edition of The Mississippi Standard Specifications for Road and Bridge Construction. Crushed stone base shall meet the standard specifications for MDOT 610 or 825B size crushed stone. Angular crushed washed stone; free of shale, clay, friable material and debris.

C. Aggregate for Surface Course: In accordance with the 1990 edition of The Mississippi Standard Specifications

for Road and Bridge Construction. Angular crushed washed stone; free of shale, clay, friable material and debris.

1. Graded in accordance with ASTM D2487 group symbol GW.

D. Prime coat: In accordance with the 1990 edition of The Mississippi Standard Specifications for Road and Bridge Construction. Asphalt emulsion penetrating prime coat consisting of either SS 1H, Asphalt Emulsion Prime (AEP), or equivalent.

E. Tack Coat: In accordance with the 1990 edition of the Mississippi Standard Specifications for Road and Bridge Construction. Emulsified asphalt; AASHTO M140 or AASHTO M208, SS 1H, CSS 1, or CSS 1H, may be diluted with up to 1 part water to 1 part asphalt.

F. Lime: Lime for soil stabilization shall meet the requirements of State of Mississippi Standard Specifications for Road and Bridge Construction. Mix materials in accordance with State of Mississippi Standard Specifications for Road and Bridge Construction using the Class C lime procedure. Lime treatment of the subgrade shall utilize 6 percent hydrated lime by dry weight of soil. Carefully add water to the mix to achieve a consistent mixture without lumping yet not create a wet plastic consistency.

2.2 ASPHALT PAVING MIXES AND MIX DESIGN

A. Use dry material to avoid foaming. Mix uniformly.

B. Surface Course: Shall be type MDOT SC-1, Type 8 in accordance with the 1990 edition of the Mississippi Standard Specifications for Road and Bridge Construction.

C. Base Course: Shall be type BB-1 Type 6, in accordance with the 1990 edition of the Mississippi Standard Specifications for Road and Bridge Construction.

D. Submit proposed mix design of each class of mix for review prior to beginning of work.

2.3 SOURCE QUALITY CONTROL

A. Test mix design and samples in accordance with AI MS-2 and the MDOT Standard Specifications for Road and Bridge Construction, latest edition.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.2 PREPARATION – LIME TREATEMENT

A. Site mix subsoil, backfill and compact. Blend treated subsoil mix to achieve mix formulation and required stabilization.

B. Mix and wait 16 hours minimum and no more than 72 hours maximum before placing.

C. Compact mixed material in continuous layers from bottom to top.

D. Maintain optimum moisture content of mix materials to attain required stabilization.

E. Do not exceed 30 minutes in placing adjacent mixed material.

F. Commence compaction of mix no later than 60 minutes after placement.

G. Compact mix to 98% standard proctor density (ASTM D698).

H. Shape to required line, grade, and cross section.

I. Make grade changes gradual. Blend slope into level areas.

J. At end of day, terminate completed work by forming a straight and vertical construction joint.

K. Replace damaged fill with new mix to full depth of original mix.

L. Remove surplus mix materials from site.

M. Curing: Immediately following compaction of mix, seal top surface with curing seal (prime coat). Do not permit traffic for 72 hours after sealing top surface.

3.3 PREPARATION - PRIME COAT

A. A prime coat is not required if the base is properly prepared and the first lift of asphalt is placed within a week of preparing the asphalt base. If not using a prime coat, the paving operations should be sequenced to prevent the prepared base from being exposed to inclement weather.

B. Apply prime coat in accordance with manufacturer's instructions. Apply to base material surfaces at least 24 hours in advance.

C. Apply at a rate of 0.25 – 0.30 gal per sq. yd. over compacted base material. Apply to penetrate and seal but not flood surface.

D. Take necessary precautions to protect adjacent areas from over spray.

E. Cure and dry as long as necessary to attain penetration of compacted base and evaporation of volatile substances. The prime coat should be allowed to break and set prior to application of the asphalt surface being applied.

3.4 PREPARATION - TACK COAT

A. Apply tack coat in accordance with manufacturer's instructions. The tack coat shall be applied as a complete coating.

B. Apply to contact surfaces of previously constructed asphalt concrete base courses or portland cement concrete and surfaces abutting or projecting into asphalt concrete or into asphalt concrete pavement.

C. Apply tack coat to asphalt concrete base course or sand asphalt base course. Apply emulsified asphalt tack coat between each lift or layer of full depth asphalt concrete and sand asphalt bases and on surface of bases where asphalt concrete paving will be constructed.

D. Coat surfaces of manhole, catch basin and frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

E. Apply at rate which produces a residual of asphalt cement between 0.04 and 0.06 gal per sq. yd of surface.

F. Allow drying until at proper condition to receive paving. The tack coat should be allowed to break before application of the pavement.

3.5 PLACING ASPHALT PAVEMENT

A. Install work in accordance with Mississippi Standard Specifications for Road and Bridge Construction, latest edition.

B. Place asphalt within 24 hours of applying primer or tack coat.

C. Place asphalt concrete mixture on completed, compacted underlying surface, spread, and strike off. Spread mixture at the minimum ambient temperature that will allow the required density to be achieved.

D. Whenever possible, spread pavement by finishing machine; however, inaccessible or irregular areas may be placed by hand methods. Spread hot mixture uniformly to required depth with hot shovels and rakes. After spreading, carefully smooth hot mixture to remove segregated course aggregate and rake marks. Rakes and lutes used for hand spreading shall be type designed for use on asphalt mixtures. Do not dump loads faster that they can be properly spread. Workers shall not stand on loose mixture while spreading.

C. Placement and routing of hauling and placing equipment shall be conducted in a manner to avoid tire tracking of bituminous material onto existing paved surfaces.

D. Paving Machine Placement: Apply successive lifts of asphalt concrete in transverse directions except when placing within small areas, parallel lifts may be placed when considered more practical. Joints of successive parallel lifts shall be offset a minimum of 2 feet. Place surface course parallel to flow of traffic. Place as-phalt paving in typical strips not less than 10'-0" wide. Asphalt concrete pavement, including base and sur-face course, shall be placed in two or more lifts as indicated on drawings. Pavement thicknesses shall be thickness shown on the drawings for each course but not less than 1-1/2 inch nor more than 3 inches for each lift.

E. Compact pavement by rolling to specified density listed in the Mississippi Standard Specifications for Road and Bridge Construction, latest edition. Average density of any sampled lot shall be no less than 92% and no greater than 96% of the maximum density based on AASHTO T209, with no individual lot less than 91% or greater than 97%. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

3.6 ROLLING AND COMPACTION

A. After being spread, mixture shall be compacted by rolling as soon as it will bear the weight of rollers without undue displacement. Number, weight, types of rollers, and sequences of rolling operations shall be such that the required density and surface are consistently attained while the mixture is in workable condition.

B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

C. Breakdown Rolling: Perform breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling with hot material.

D. Compact pavement by rolling to specified density listed in the Mississippi Standard Specifications for Road and Bridge Construction, latest edition. Average density of any sampled lot shall be no less than 92% and no greater than 96% of the maximum density based on AASHTO T209, with no individual lot less than 91% or greater than 97%. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.

F. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot asphalt concrete. Compact by rolling to maximum surface density and smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked. Any masked or marred finish surfaces shall be repaired or smoothed.

H. Compaction at Unsupported Edges of Pavements: Start the first roller pass 12-15 inches from the unsupported edge. Allow the uncompacted asphalt to act as a dike to hold the mat in place. The final pass over the un-compacted dike should not slough off if the roller is supported on the compacted mat.

3.7 JOINTS

A. General: Place each asphalt paving layer as continuous as possible to keep the number of joints to a minimum. Create joints between old and new pavement, between successive days work, and where the mixture has become cold (less than 140 degrees F). Make these joints in such a manner as to create a continuous bond between the old and new pavement construction courses.

B. Construction joints shall have same texture, density, and smoothness as other sections of asphalt concrete course.

C. Transverse Joints: If placing of material is discontinued or if material in place becomes cold, make a joint running perpendicular to the direction traveled by the paver. Before placement continues, trim the edge of the previously placed pavement to a straight line perpendicular to the paver and cut back to expose an even vertical surface for the full thickness of the course. When placement continues, position the paver on the

transverse joint so that sufficient hot mixture will be spread in order to create a joint after rolling that con-forms to the required smoothness. If the temperature of the previously placed pavement material drops below 140 degrees F before paving is resumed, give the exposed vertical face a thin coat of liquid asphalt just before paving is continued.

D. Longitudinal Joints: Coat longitudinal joints that are not completed before the previously laid mixture has cooled to a temperature below 140 degrees F, with liquid asphalt just before paving is continued.

3.8 SEAL COAT (IF SPECIFIED ON THE SITE PLAN)

A. Apply seal coat to surface course in accordance with AI MS-19 and the Mississippi Standard Specifications for Road and Bridge Construction, latest edition.

3.9 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.

C. Variation from True Elevation: Within 1/2 inch.

3.10 FIELD QUALITY CONTROL

A. Responsibilities: Unless otherwise specified, the quality control tests and inspections specified below will be conducted by the Owner's Construction Testing Laboratory (CTL) at no cost to the Contractor. Field testing, frequency, and methods may vary as determined by and between the Owner and CTL. The Contractor shall perform additional testing or inspection as considered necessary by the Contractor for assurance of quality control including use of a nuclear density gauge to establish rolling patterns and monitor in-place density.

B. Core Sampling and Testing: Asphalt surface and base courses shall be randomly cored at minimum rate of 5 cores per day's placement per mix type, but not less than 5 cores in light duty areas and 5 cores in heavy-duty areas shall be obtained. Asphalt concrete pavement samples shall be tested for conformance with density and thickness requirements. Cores shall be cut from minimal loading areas representative of project.

C. Coring holes shall be immediately filled by the Contractor with full depth, hot-mix asphalt concrete or non-shrink grout tinted to match the surrounding pavement.

D. Surface Smoothness Test: In areas of obvious depressions or bumps, suspect areas of each lift shall be checked with a 10'-0" straightedge both parallel with, and at right angles to, centerline of the paved area. The variation of the surface between two contact points shall not exceed 1/4-inch.

E. Thickness Test: The Contractor shall measure pavement thickness behind the paver at the beginning of and during pavement placing operations to assure proper thickness. The CTL will measure thickness of each core sample taken. At each core location, the thickness of the course shall meet or exceed the thickness shown. If the thick-ness of a lower course of asphalt is less than the thickness shown, it shall be identified as a deviation and record-ed. The Contractor shall either remove and replace the deficient pavement or increase the thickness of the upper course so that the total thickness of the pavement meets or exceeds the design thickness, provided that the specified compaction of the lower lift is achieved. If the Contractor elects to increase the thickness of the upper course, three additional cores shall be taken in the area after the upper course is laid to verify that the total thick-ness is achieved.

F. Field density test for in-place materials:

1. Density tests shall be conducted on each core sample taken in accordance with ASTM D1188 or D2726 (AASHTO T166, T275, T331) as applicable.

2. In-place density tests by nuclear method in accordance with ASTM D2950 shall also be taken by the Contractor as necessary to assure the specified density is obtained. Nuclear density shall be correlated with ASTM D1188 or D2726 or AASHTO T166, T275, T331 as applicable.

3. Density tests on courses to be overlaid by subsequent courses shall be performed within 48 hours prior to placement of next lift. If inclement weather occurs after testing, retest prior to placement of next lift.

G. Volumetric Properties: Obtain test samples from the truck at the asphalt plant. Mixture samples shall be taken at least 2 times for every 8 hour day.

1. Compact into specimens in accordance with AASHTO T312. Test each specimen for determination of relative density, VMA, VFA, and dust-to-binder ratio.

H. Check surface areas as necessary to identify ponding areas. Remove and replace unacceptable paving as directed by Architect.

I. Asphalt Content and Aggregate Gradation: Asphalt content extraction and gradation of extracted aggregate testing shall be performed in accordance with AASHTO T 308 or AASHTO T164 and ASTM D5444 respectively and local State Highway Department Specifications requirements. At least two asphalt content and two gradation tests shall be taken for each 2000 tons or each day pavement is placed.

J. Areas of deficient paving, including compaction, smoothness, thickness, and asphalt mixture, shall be delineated, removed, and replaced in compliance with specifications requirements. Alternative remedial or corrective measures for repair of deficient paving may be allowed provided a plan of corrective action is submitted in the form of a Request For Information (RFI) and the plan is approved by the Engineer.

K. The Contractor shall certify in writing that asphalt placement is in accordance with specification requirements.

3.11 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury until surface temperature is less than 140 degrees F.

END OF SECTION

SECTION 32.1313

Concrete Paving and Sidewalks

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Concrete curbs, gutters, parking areas and roads.

1.2 RELATED REQUIREMENTS

A. Section 03.2000 - Concrete Reinforcement.

B. Section 03.1000 – Concrete Forms and Accessories.

C. Section 31.2000 – Earthwork.

D. Section 32.1216 - Asphalt Paving.

E. Geotechnical Report: Geotechnical Exploration Football Field Improvements Ridgeland High School by Burns Cooley Dennis, Inc, dated April 21, 2021.

1.3 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).

B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2010.

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.

D. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 2010.

E. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 2010.

F. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.

G. ASTM A497 - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete; 2007.

H. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2009b.

I. ASTM C33 - Standard Specification for Concrete Aggregates; 2011.

J. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2010.

K. ASTM C94 - Standard Specification for Ready-Mixed Concrete; 2011.

L. ASTM C150 - Standard Specification for Portland Cement; 2011.

M. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2010b.

N. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

O. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2007.

P. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete; 2010a.

Q. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2008a.

R. ASTM C685 - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2010.

S. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2008).

T. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2004a (Reapproved 2008).

U. Mississippi Standard Specifications for Road and Bridge Construction, 2017 Edition.

1.4 SUBMITTALS

A. See Section 01.3300 -Submittal Procedures.

B. Product Data: Provide data on joint filler, admixtures, and curing compound.

C. Mix Design: Submit three copies of each proposed mix design in accordance with ACI 301, Sections 3.9 "Proportioning on the basis of previous field experience or trial mixture", or 3.10 "Proportioning based on empirical data". Submit separate mix design for concrete to be placed by pumping in addition to the mix design for concrete to be placed directly from the truck chute. Submit mix design to the Architect. Include all applicable information including the following:

1. Proportions of cementitious materials, fine and coarse aggregate, and water.
2. Water cementitious material ratio, 28-day compressive design strength, slump, and air content.
3. Type of cement, fly ash, slag and aggregate.
4. Individual aggregate gradations.
5. Type and dosage of admixtures.
6. Special requirements for pumping.
7. Range of ambient temperature and humidity for which design is valid.
8. Special characteristics of mix which require precautions in mixing, placing, or finishing techniques to achieve finished product specified.
9. Materials and methods for curing concrete.

D. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.

PART 2 – PRODUCTS

2.1 PAVING ASSEMBLIES

A. Comply with applicable requirements of ACI 301.

B. Concrete Sidewalks and Curbs: 4,000 psi 28 day concrete

D. Pavement (if required by project): 4,000 psi 28 day concrete

2.2 FORM MATERIALS

A. Form Materials: Conform to ACI 301.

B. Wood form material, profiled to suit conditions.

C. Pavement Joint Materials:

1. Joint Back-up Material: Polyethylene foam, 100% closed cell
2. Soft Preformed Joint Filler: Flexible closed-cell non-extruded synthetic foam expansion joint strips.
    a. Ceramar Flexible Foam Expansion Joint, by W.R. Meadows.
    b. Deck-O-Foam Expansion Joint Filler, by W.R. Meadows
    c. Expansion Joint Filler, by BASF Building Systems (Degussa) (Formerly Sonneborn Sonolastic).

3. Sealant:
    a. Dow 888, by Dow Corning.
    b. 301 NS by Pecora.
    c. Spectrum 800 or 900 by Tremco.

2.3 REINFORCEMENT

A. Reinforcing Steel and Welded Wire Reinforcement: Types specified in Section 03.2000.

B. Dowels: ASTM A615 Grade 60; deformed billet steel bars; unfinished finish.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C150, Type I or II. Obtain cementitious materials from same source throughout.

B. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

C. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.

1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

D. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

E. Concrete Properties:

1. Compressive Strength – Pavement areas - when tested in accordance with ASTM C39 at 28 days: 4,000 psi.
2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
3. Water-Cement Ratio: Maximum 48 percent by weight.
4. Total Air Content: 3-6 percent, determined in accordance with ASTM C173.
5. Slump Range: 1-3 inches.

2.5 MIXING

A. Transit Mixers: Comply with ASTM C94.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads. Proofroll prepared base material surface to check for unstable areas in accordance with Section 31.2000 including documentation and re-proof rolling as required. Paving work shall begin only after unsuitable areas have been corrected and are ready to receive paving.

B. Remove loose material from compacted base material surface to produce firm, smooth surface immediately before placing concrete.

C. Verify gradients and elevations of base are correct.

3.2 PREPARATION – LIME TREATMENT (IF REQUIRED ON THE DRAWINGS)

A. Site mix subsoil, backfill and compact. Blend treated subsoil mix to achieve mix formulation and required stabilization.

B. Mix and wait 16 hours minimum and no more than 72 hours maximum before placing.

C. Compact mixed material in continuous layers from bottom to top.

D. Maintain optimum moisture content of mix materials to attain required stabilization.

E. Do not exceed 30 minutes in placing adjacent mixed material.

F. Commence compaction of mix no later than 60 minutes after placement.

G. Compact mix to ASTM D698.

H. Shape to required line, grade, and cross section.

I. Make grade changes gradual. Blend slope into level areas.

J. At end of day, terminate completed Work by forming a straight and vertical construction joint.

K. Replace damaged fill with new mix to full depth of original mix.

L. Remove surplus mix materials from site.

M. Curing: Immediately following compaction of mix, seal top surface with curing seal (prime coat). Do not permit traffic for 72 hours after sealing top surface.

3.3 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

B. Coat surfaces of manhole frames with oil to prevent bond with concrete pavement.

C. Notify Architect minimum 24 hours prior to commencement of concreting operations.

3.4 AGGREGATE BASE PLACEMENT

A. Unless otherwise specified on the Drawings, place aggregate base as specified herein.

B. Aggregate Base:

1. Install aggregate base where shown on Drawings. Aggregate base shall consist of No. 610 crushed limestone meeting the requirements of the Mississippi Standard Specification for Road and Bridge Construction, 1990 edition.

2. Compact to final thickness shown in layers not exceeding 6 inches with minimum of 2 passes per layer with vibratory compactor.

3. Compact fill to 100% of aggregate's Standard Proctor as determined by Method D of ASTM D698 at moisture contents within 3 percentage points of optimum water content.

4. Leave base up to 2 inches low until just prior to concrete placement.

C. Aggregate Base Fine Grading:

1. Compact to final thickness shown with 2 passes minimum vibratory compactor to produce smooth, flat, dense surface.

2. Do not allow excess moisture in or on base at time of placing concrete.

3. Verify adequate fines at surface immediately prior to concrete slab placement.

4. Provide dry, smooth, flat, dense surface

5. Proof-roll 48 hrs maximum prior to concrete placement. Depression under a fully loaded ready mix truck shall not exceed 1/2 inch.

D. Pavement Aggregate Base Fine Grade Tolerance: +0 inch, -3/4 inch with transition no greater than 3/4 inch vertically to 8 inches horizontally.

3.5 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient. Comply with requirements of specification Section 03.1000.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.6 REINFORCEMENT

A. Place reinforcement as indicated.

B. Interrupt reinforcement at contraction joints.

C. Place dowels to achieve pavement and curb alignment as detailed.

3.7 COLD AND HOT WEATHER CONCRETING

A. Follow recommendations of ACI 305R when concreting during hot weather.

B. Follow recommendations of ACI 306R when concreting during cold weather.

C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

3.8 PLACING CONCRETE

A. Coordinate installation of snow melting components.

B. Place concrete in accordance with ACI 304R.

C. Do not place concrete when base surface is wet.

D. Place concrete using the slip form technique.

E. Ensure reinforcement, inserts, embedded parts and formed joints are not disturbed during concrete placement.

F. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

3.9 JOINTS

A. Align curb, gutter, and sidewalk joints.

B. Saw cut contraction joints 1/4 inch wide at an optimum time after finishing. Cut 1/4 into depth of slab.

C. Contraction Joints: Provide joints at spacing shown on the plans. See plans and details for additional information. Construct contraction joints for depth equal to at least 1/4 of the concrete thickness, as follows:

1. Form tooled joints in fresh concrete by grooving top with recommended tool and finishing edge with jointer.

2. Sawed Contraction Joints:

a. Use saws, blades, skid plates, and accessories by Soff-Cut International, Inc. or approved equal.

b. Start cutting sawed joints as soon as concrete has hardened sufficiently to prevent raveling or dislodging of aggregates. This will typically be from 1 hour in hot weather to 4 hours in cold weather after completing finishing of slab in that joint location.

c. Provide at least two “Soff-Cut” saws on site with blades capable of achieving the required depth of saw cut.

d. Extend sawed joint to the slab boundaries and abutments, including columns, drains, and other penetrations in the path of a defined joint. Implement methods and timing of the saw cut beyond the limits of the Soff-Cut saw reach to provide a consistent depth of cut with minimal raveling of joint edges.

D. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for period of more than 1/2 hour. Construct joints in accordance with details shown.

E. Isolation and Fixed Object Joints: Construct joint at locations and in accordance with details shown.

F. Pavement Joint Materials: Place joint fillers, back-up material, and sealants at locations shown and in accordance with manufacturer's instructions.

1. Soft Preformed Joint Fillers: Extend preformed joint fillers full width and depth of joint, and not less than 1/2-inch or more than 1-inch below finished surface. Furnish preformed joint fillers in 1 piece lengths for full width being placed, wherever possible. Where more than 1 length is required, lace or clip preformed joint filler sections together in a single plane.

3.10 FINISHING

A. Area Paving: Light broom, texture perpendicular to pavement direction so as to produce regular corrugations not over 1/16 of an inch deep.

B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.

C. Curbs and Gutters: Light broom, texture parallel to pavement direction.

D. Inclined Vehicular Ramps: Broomed perpendicular to slope.

E. Place sealer on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

F. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point up minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Owner.

3.11 TOLERANCES

A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

B. Maximum Variation From True Position: 1/4 inch.

3.12 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01.4000. Field testing, frequency, and methods may vary as determined by and between the Owner and the Owner's Testing Laboratory

1. Provide free access to concrete operations at project site and cooperate with appointed firm.

2. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

3. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

B. Compressive Strength Tests: Mold and cure specimens in accordance with ASTM C31. Cylinders shall be tested in accordance ASTM C39. For each test, mold and cure three concrete test cylinders. A minimum of four concrete test cylinders shall be taken for every 100 cubic yards or less of each class of concrete placed each day and not less than once for each 5000 square feet of paved area.

1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

2. Conduct slump test for each cylinder set taken in accordance with ASTM C143. Make additional slump tests for every other load from a stationary mixer or truck to test consistency. Sampling shall be in accordance with ASTM C172.

3. Conduct air content test for each cylinder set for concrete in accordance with ASTM C 231, ASTM C 173, or ASTM C 138. Indicate test method on report. Make test at same time as slump test.

C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

D. Review each delivery ticket of concrete. Report type of concrete delivered, amount of water added and time at which cement and aggregate were loaded into truck, and time at which concrete was discharged from truck.

E. In Place Pavement Testing: Randomly core pavement in low traffic volume areas at minimum rate of 1 core per 20,000 sq. ft of pavement, with minimum of 3 cores. Sample and test cores in accordance with ASTM C42. Core will be tested for thickness and quality of aggregate distribution. Core holes shall be patched by the Contractor immediately with Portland cement concrete and shall be finished to provide level surface as specified herein. If results of testing indicate, in opinion of the owner and Engineer, that strength of concrete is inadequate, replacement may be required at no additional cost to the owner. Any additional testing performed due to concrete materials not meeting the requirements of this specification will be performed by the Owner's testing laboratory and paid for by the contractor.

3.13 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury. Protect and cure finished concrete paving using curing compound. Cure for a period not less than 7 days.

B. Do not permit pedestrian traffic over pavement for 7 days minimum after finishing.

C. Do not permit pedestrian traffic over pavement until 75 percent design strength of concrete has been achieved.

D. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just prior to final inspection.

E. Protect concrete from damage until acceptance of work. Exclude construction traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials.

END OF SECTION

SECTION 33.4111

Storm Utility Drainage Piping

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Storm Drainage Piping, Fittings, and Accessories.

B. Connection of Drainage System to Municipal Sewers.

C. Catch Basins, Plant Area Drains, Paved Area Drainage and Site Surface Drainage.

1.2 RELATED REQUIREMENTS

A. Section 03.3000 - Cast-In-Place Concrete.

B. Section 31.2000 - Earthwork.

1.3 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.4 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; Final Rule; 2010; (ADA Standards for Accessible Design).

B. ASTM C 990 - Joints for Concrete Pipe, Manholes, and Precast Box Sections using Preformed Flexible Joint Sealants.

C. ASTM C 443 - Joints for Circular Concrete Sewer and Culvert Pipe, using Rubber Gaskets.

D. ASTM C 506 – Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe.

E. ASTM C 76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

F. ASTM D 3034 - Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.

G. ASTM D 3212 - Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

H. ASTM F 477 - Elastomeric Seals (Gaskets) For Joining Plastic Pipe.

I. ASTM F 949 - Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with Smooth Interior and Fittings.

1.5 SUBMITTALS

A. See Section 01.3400 – Shop Drawings, Product Data and Samples, for submittal procedures.

B. Product Data: Provide data indicating pipe and pipe accessories.

C. Project Record Documents:

1. Record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.

2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the work of this section.

PART 2 – PRODUCTS

2.1 SEWER PIPE MATERIALS

A. Corrugated Polypropylene Pipe (HP Storm or equal), ASTM F667, smooth core interior, inside nominal diameter as noted on plan. Watertight joints required. Polypropylene pipe shall be HP Storm by ADS or approved equal.

B. Reinforced Concrete Pipe (RCP): ASTM C 76, Class III unless noted otherwise on drawings. Reinforced concrete arch pipe shall meet the requirements set forth in ASTM C 506.

1. Joint Material: Provide rubber o-ring gasket meeting AASHTO M 198, Type B or ASTM C 443. All RCP joints be wrapped with a geotextile fabric with a minimum 12” lap on each side of the joint.

C. Polyvinyl Chloride (PVC) Pipe: ASTM D 3034, rated SDR 26, or ASTM F 949 for profile pipe, continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM D3034 classification. Only permitted when specifically indicated on drawings. PVC is only permitted in pipes 18” in diameter or less.

1. Pipe joints conforming to ASTM D 3212.

2. Joint Material: Restrained gasket, ASTM F 477.

2.2 PIPE ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

B. Filter Fabric: Non-biodegradable, woven.

C. Trace Wire: magnetic detectable conductor, clear plastic covering, imprinted with "Storm Sewer Service” in large letters.

2.3 CATCH BASIN, TRENCH DRAIN, CLEANOUT, AND AREA DRAIN COMPONENTS

A. Lids and Drain Covers: As shown on Drawings.

B. Trench Drain System: As shown on Drawings.

2.4 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31.2000.

B. Cover: As specified in Section 31.2000.

PART 3 – EXECUTION

3.1 TRENCHING

A. See Section 31.2000 for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.2 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Inspect pipe for defects and cracks before being lowered into the trench, piece by piece. Remove and replace defective, damaged or unsound pipe or pipe that has had its grade disturbed after laying. Protect open ends with a stopper to prevent earth or other material from entering the pipe during construction. Remove dirt, excess water, and other foreign materials from the interior of the pipe during the pipe laying progress.

C. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.

1. Plastic Pipe: Also comply with ASTM D2321.

D. Commence installation at the lowest point for each segment of the route. Lay RCP with the groove or bell end upstream.

E. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in

10 feet.

F. Connect to building storm drainage system, foundation drainage system, and utility/municipal storm sewer system.

G. Make connections through walls through sleeved openings, where provided.

H. Do not displace or damage pipe when compacting.

I. Do not place pipe in water or when trench conditions are unsuitable for such work.

J. Install continuous trace wire along top of pipe; coordinate with Section 31.2316.13.

3.3 INSTALLATION - CATCH BASINS, JUNCTION BOXES, TRENCH DRAINS AND CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation. Provide bedding material in accordance with specification 31.2000. Excavation and bedding to be observed and tested by construction testing laboratory in accordance with specification 31.2000.

B. Construct drainage structures in accordance with details shown on the contract drawings and in accordance with section 33.0513 as applicable.

C. Precast Structures:

1. Install precast structures with base in accordance with 31.2000 and 33.0513 or as shown on the drawings.

2. Align pipe openings to that of the pipe entering and leaving the storm structure. Pipe with connections to structures as shown on the drawings.

D. Establish elevations and pipe inverts for inlets and outlets as indicated. Invert channels shall be smooth and accurately shaped to a semicircular bottom conforming to the inside of the adjacent sewer section. Shape invert channels and structure bottoms with cement mortar. Changes in size and grade of invert shall be made gradually and evenly. Changes in direction of the sewer entering branch or branches shall have a true curve of as large a radius as the manhole will permit

E. Mount lid and frame level in grout, secured to top cone section to elevation indicated. Adjustment rings used to make adjustments in grade shall be made with the initial ring embedded in mortar and the exterior of the rings parged with mortar not less than 1/2 inch thick. No adjustment made in this manner shall exceed 8 inches.

F. Prefabricated Trench Drains:

1. Excavate; prepare substrate and supports according to the manufacturer's printed installation instructions.

2. Install prefabricated trench drain system according to the manufacturer's printed installation instructions.

3. Expansion, Construction And Control Joints: Do not locate trench drain system on an expansion, construction or control joint in concrete or pavement. Where concrete or pavement joints running transverse to direction of flow cross the trench drain system, locate concrete or pavement joints and trench drain system joints so that both coincide.

4. Concrete Trench Support: 4000 pounds per square inch compressive strength, minimum.

a. Provide support on all sides of trench in minimum thickness recommended by trench drain system manufacturer.

b. Screed and finish top edge of concrete flush with top surface of trench drain system.

c. Do not use secondary edge finishing tools.

3.4 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01.4100. Clean, inspect, and test storm sewer systems and culverts, upon completion or at such time as directed. The system or culvert shall have a true grade and line. Actual elevations shall be within 0.08 feet of the elevations given on the drawings. However, on low slope pipe systems, the design intent, including positive drainage, must be maintained regardless of allowable tolerance.

B. Alignment Test: After backfill has been placed and compacted to a depth not less than one foot above top of pipe, a visual inspection shall be made by flashing a light between drainage structures. Correct displacement or misalignment of invert.

C. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

3.5 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

BURNS COOLEY DENNIS, INC.

GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

Corporate Office
551 Sunnybrook Road
Ridgeland, MS 39157
Phone: (601) 856-9911
Fax: (601) 853-2077

Mailing Address
Post Office Box 12828
Jackson, MS 39236

www.bcdgeo.com

Materials Laboratory
278 Commerce Park Drive
Ridgeland, MS 39157
Phone: (601) 856-2332
Fax: (601) 856-3552

April 21, 2021

Madison County School District
476 Highland Colony Parkway
Ridgeland, Mississippi 39157

Report No. 210177

Attention: Mr. Richard Burge
Assistant Superintendent

Geotechnical Exploration
Football Field Improvements
Ridgeland High School
Ridgeland, Mississippi

Dear Mr. Burge:

Submitted here is the report of our geotechnical exploration for the above-captioned project. This exploration was authorized by Purchase Order 2105767 dated March 9, 2021 and was generally performed in accordance with our Proposal No. 21001P-54 dated March 1, 2021.

We appreciate the opportunity to be of service. If you should have any questions concerning this report, please do not hesitate to call us.

Very truly yours,

BURNS COOLEY DENNIS, INC.

RC Ahlrich

R. C. Ahlrich, Ph. D., P.E.

RANDOLPH CHARLES AHLRICH
REGISTERED PROFESSIONAL ENGINEER
10181
4/21/2021
STATE OF MISSISSIPPI

Marcos V. F. Rodrigues

Marcos V. F. Rodrigues, P.E.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Project Description

We understand plans are being made to make improvements and repairs to the existing Ridgeland High School (RHS) football field during the Summer of 2021. These improvements and repairs will include the replacement of the football field synthetic turf, improvement and modification to the football field surface drainage and the replacement of the subsurface storm drainage system along the "Home" side (West) of the football field. An overall view of the RHS football field is shown on Figure 1A.

It is our understanding that this football facility is about 15 years old and the football playing surface was originally grass (2005). In 2010, the football field was resurfaced with a synthetic turf that included the installation of a subsurface drainage system.

Based on information provided by Madison County School District representatives, this facility (track and football field) has experienced significant differential vertical movement since its original reconstruction (2010). During 2014 and 2015, the running track was reconstructed and rebuilt utilizing an 8 ft over excavation and backfill. Within the last 5 years, we were informed that the football field along the "Home" side has experienced significant heaving between the running track and football field hash marks on the western side of the field (approximately 60 ft wide). This area of significant heaving in the current football field was constructed along a tree line that was removed during the initial construction of the RHS football facility (Figure 1B). We were also informed that the storm pipe along the western side of the field is not performing as designed and may be leaking.

1.2 Purposes

The specific purposes of this exploration were:

1) to make exploratory soil borings within the areas planned for reconstruction of the football field synthetic turf and storm pipe;

2) to verify field classifications and to evaluate pertinent physical properties of the soils encountered in the borings by means of visual examination of the soil samples in the laboratory and routine tests performed on the samples; and

3) after analysis of the soil boring and laboratory test data, to provide recommendations for site preparation and earthwork construction for the new synthetic turf system.

2.0 FIELD EXPLORATION

2.1 General

Subsurface soil conditions within the area planned for reconstruction of the synthetic turf and storm pipe within the RHS football field were explored by means of ten borings. The approximate locations of the borings are shown on Figures 1C and 1D. The location of the borings were chosen in order to evaluate the subsurface soil conditions within the western half of the RHS football field where the differential movement is most noticeable.

All soils were classified in general accordance with the Unified Soil Classification System. A synopsis of the Unified Soil Classification System is presented on Figure 2 along with symbols and terminology typically utilized on graphical soil boring logs. Graphical logs of the borings are presented on Figures 3 through 12. The graphical logs illustrate the types of soil and stratification encountered with depth below the existing ground surface at the individual boring locations. Ground elevations at the boring locations were not determined.

2.2 Drilling Methods and Groundwater Observations

Borings 1, 2, 4, 5, 6, 8 and 10 were made to an exploration depth of 15 ft within the repair area of the football field and Borings 3, 7 and 9 were made to a depth of 10 ft along the high spots where the differential movement is most noticeable. The borings were advanced full depth by dry augering. Observations were made continuously during auger drilling to detect free water entering the open boreholes. Notes pertaining to groundwater observations are included at the bottom right corner of the graphic boring logs and listed in Table 1. Chemical tests on water samples from Borings 1, 3, 7 and 9 did not indicate the presence of chlorine in the groundwater.

TABLE 1
GROUNDWATER OBSERVATIONS

Boring No.	Free Water Measurements	
	March 20, 2021	March 22, 2021
1	NFW	5.3 ft
2	NFW	5.3 ft
3	3.0 ft	1.0 ft
4	NFW	NFW
5	NFW	Hole Sloughed in at 8.5 ft
6	NFW	NFW
7	2.5 ft	0.5ft
8	NFW	NFW
9	2.0 ft	0.5 ft
10	NFW	NFW

Notes: See Figures 1C and 1D for approximate boring locations
NFW – No free water encountered
Chemical tests indicate no chlorine in water samples from B-1, B-3, B-7, B-9

2.3 Sampling Methods

Relatively undisturbed samples of the soils encountered in the borings were obtained at approximate 3-ft to 5-ft and 8-ft to 10-ft intervals of depth by pushing a 3-in. OD Shelby tube sampler approximately 2 ft into the soil. The Shelby tube samples were obtained within the depth intervals illustrated as shaded portions of the "Samples" column of the graphic boring logs. Disturbed auger cutting samples were taken at approximately 1-ft intervals within the borings. The depths at which the auger cutting samples were taken are illustrated as small I-shaped symbols under the "Samples" column of the graphic boring logs.

2.4 Field Classification, Sample Preservation and Borehole Abandonment

All soils encountered during drilling were examined and classified in the field by a geotechnical engineering technician. The Shelby tube samples were extruded from the sampling tube in the field. An approximate 6-in. long portion of each Shelby tube sample was sealed with melted paraffin in a cylindrical cardboard container to prevent moisture loss and structural disturbance. An additional portion of each Shelby tube sample and the auger cutting samples were sealed in jars to provide material for visual examination and testing in the laboratory. Unless other disposition is requested, we routinely discard soil samples after about six months of

storage. The boreholes were plugged with soil cuttings and quikrete after groundwater observations were made on March 22, 2021.

3.0 LABORATORY TESTING

3.1 General

All of the soil samples were examined in the laboratory and tests were performed on selected samples to verify field classifications and to assist in evaluating the strengths, and volume change properties of the soils encountered. The types of laboratory tests performed are described in the following paragraphs.

3.2 Classification Tests

The classifications and volume change properties of the fine-grained soils encountered in the borings were investigated by means of 54 Atterberg liquid and plastic limit tests performed on selected representative samples. The results of the liquid and plastic limit tests are presented in the "Atterberg Limits" column in the data section of the graphic boring logs. In accordance with the Unified Soil Classification System, fine-grained soils are classified as either clays or silts of low or high plasticity based on the results of Atterberg limit tests. The numerical difference between the liquid limit and plastic limit is defined as the plasticity index (PI). The magnitudes of the liquid limit and plasticity index and the proximity of the natural water content to the plastic limit are indicators of the potential for a fine-grained soil to shrink or swell upon changes in moisture content or to consolidate under loading. The proximity of the natural water content to the plastic limit is also an indicator of soil strength and future shrink/swell potential.

3.3 Water Content Tests

Water content tests were performed on 135 samples to corroborate field classifications and to extend the usefulness of the strength and plasticity data. The results of the water content tests are plotted as small shaded circles in the data section of the graphic boring logs. The water content data are listed in the "Water Content" column of the graphic boring logs.

4.0 GENERAL SUBSURFACE CONDITIONS

4.1 General

A general description of subsurface soil and groundwater conditions revealed by the borings made for this exploration is provided in the following paragraphs. The graphical logs shown on Figures 3 through 12 should be referred to for specific soil and groundwater conditions encountered at each boring location. Stick logs of the borings are shown in profile on Figures 13 to 16 to aid in visualizing subsurface soil conditions. Tabulated adjacent to the stick logs are Atterberg liquid and plastic limits and water contents.

4.2 Soil Stratification

Subsurface soils encountered within the 15-ft maximum completion depth of the borings made for this exploration generally consist of silty clays (CL) underlain by transitional clays (CH) and weathered Yazoo clays (CH). Some of the near surface CL soils encountered are considered to be fill materials and/or lime treated. Other CL soils could be fill, but it is difficult to adequately distinguish fill from natural CL soils. The silty clay (CL) soils were found to have consistencies that varied from soft to very stiff. The soft and medium stiff silty clays (CL) are considered to have low to low-moderate strength and were encountered below the stone drainage layer to depths ranging from about 1.5 ft to 5.5 ft. The remaining CL soils are generally considered to have moderate to high strength. The silty clays (CL) are considered to have low shrink/swell potential.

Transitional clays (CH) and Weathered Yazoo clays (CH) were encountered at depths ranging from 2.5 ft to 7.5 ft below the stone drainage layer. The clay (CH) soils were found to have consistencies that varied from medium stiff to very stiff. The medium stiff clay (CH) soils are considered to have low to moderate strength. The transitional clays (CH) are considered to be expansive with high shrink/swell potential. The weathered Yazoo clays (CH) are very expansive with very high shrink/swell potential. The weathered Yazoo clays (CH) extend to the 10-ft and 15-ft termination depths of the borings. The depths at which the expansive clays (CH) were encountered are presented in Table 2.

TABLE 2
EXPANSIVE CLAY (CH) DEPTHS

Boring No.	Depth Intervals (ft)	
	Transitional Clay (CH)	Weathered Yazoo Clay (CH)
1	7.5 – 10.5	10.5- 15
2	5.5 – 6.5	6.5 – 15
3	---	6.5 – 10
4	2.5 – 5.5	5.5 – 15
5	---	7.5 – 15
6	5.5 – 6.5	6.5 – 15
7	6.5 – 7.5	7.5 – 10
8	---	5.5 – 15
9	---	6.5 – 10
10	4.5 – 6.5	6.5 - 15

4.3 Groundwater

Free water was initially encountered during auger drilling on March 20, 2021 within Borings 3, 7, and 9 at approximate depths of 3 ft, 2.5 ft and 2 ft, respectively. Free water was not encountered during auger drilling for the remaining borings on March 20, 2021. The boreholes were allowed to remain open for 48 hours. After the observation period of about 48 hours, the water levels in Borings 1, 2, 3, 7 and 9 were measured at depths of about 5.3 ft, 5.3 ft, 1 ft, 0.5 ft and 0.5 ft, respectively. Free water was not encountered during auger drilling for the remaining borings on March 22, 2021. In our opinion, groundwater conditions at the site will primarily be influenced by rainfall, surface drainage, subsurface drainage and by underground utilities. Groundwater conditions at the site can also be influenced by man-made changes. Soils which did not exhibit free water during the short time period of drilling may exhibit water seepage at other times during construction. **Surficial soils can become saturated and weak to relatively shallow depths during periods of prolonged and heavy rainfall.**

5.0 DISCUSSION

5.1 General Soil Conditions

Subsurface soils encountered within the 15 ft maximum exploration depth of the borings made for this exploration consist of silty clays (CL), transitional clays (CH) and Weathered Yazoo clays (CH). The moisture conditions of the CL soils vary from below the plastic limit

(dry) to significantly above the optimum moisture content (wet). The soft and medium stiff (high moisture content) CL soils will become unstable during repetitive passes of construction equipment and trucks. The highly expansive clay (CH) soils were encountered at depths ranging between 2.5 ft and 7.5 ft below the synthetic turf drainage layer. Free water was also encountered within Borings 1, 2, 3, 7 and 9.

5.2 Expansive Clay Considerations

The expansive clay (CH) soils can experience significant shrink/swell movements associated with seasonal moisture content fluctuations. Cover materials overlying expansive clay (CH) soils act as a buffer against seasonal moisture content changes caused by rainy weather, droughts and evapotranspiration. Thus, the potential magnitude of moisture content changes and associated shrink/swell movements within expansive clay (CH) soils is proportionate to the thickness of overlying cover materials. Seasonal moisture content changes and shrink/swell movements within expansive clay (CH) soils decrease as the thickness of cover materials increases. There is a general trend for expansive clay (CH) soils under structures to swell due to an increase in water content caused by capillary and vapor phase movement of moisture within the clays (CH). Expansive clay (CH) soils will also experience considerable swelling if directly supplied with water from rainfall, sprinkler systems, broken underground water and sewer pipes, or any other source.

5.3 Groundwater Considerations

Due to the presence of significant groundwater within the area experiencing significant heaving, careful observance of groundwater should be performed during earthwork operations. **All possible sources of water should be evaluated during construction. All underground utilities should be monitored and inspected to check for groundwater; specifically, the storm pipe adjacent to the running track and the underground electrical power lines that cross the football field.**

5.4 Design Considerations

From a geotechnical standpoint, the primary factors relevant the improvement and repairs of the RHS football field are poor subgrade conditions due to saturated silty clays (CL) and the

shrinking and swelling of the expansive clays (CH). The expansive clay (CH) soils can experience shrink/swell movements associated with seasonal moisture content fluctuations.

Within the planned reconstruction and repair areas, the highly expansive clays (CH) and saturated silty clay (CL) soils were encountered at various depths of the borings. Undercutting and backfilling should be required for the football field repairs to remove expansive clays (CH) and/or saturated CL soil and provide for the placement of an adequate buffer of low permeability and low shrink/swell potential soil. **The recommended CL soil buffer should minimize, not eliminate, future differential vertical movements within the RHS football field caused by shrinking and swelling of the expansive clays (CH) due to ordinary seasonal moisture content fluctuations.**

Due to the high moisture contents of the subsurface CL soils, we caution that the existing soils may become unstable soils when disturbed and exposed to construction traffic. Although these CL soils are typically adequate for fill soils, the high in situ moisture contents may limit the expedient use of these soils as backfill materials unless these soils are improved, processed and dried. These excavated CL soils could be stockpiled and used at a later date on another MCSD earthwork project.

Details of our recommendations for site preparation and earthwork construction are included in the following subsections of this report.

6.0 RECOMMENDATIONS

6.1 Site Preparation and Earthwork Construction

As an initial step of site preparation within the proposed reconstruction areas, all existing synthetic turf materials, underground utilities, and any other subsurface obstructions that might interfere with earthwork construction should be removed and/or relocated. **Excavation should then be performed to remove a sufficient thickness of wet silty clay (CL) soils and expansive clays (CH) to provide not less than 8 ft of low permeability, low shrink/swell potential buffer soils below the bottom of the synthetic turf system. The 8 ft buffer should extend from the track curb approximately 60 ft toward mid field. This 8 ft over excavation should then slope upward to the final subgrade elevation at midfield with a typical slope of not less than 5H to 1V.**

The actual vertical and lateral extent of excavation required to remove weak soils and undercutting required to remove expansive clays (CH) must be determined in the field during earthwork construction. **In order to minimize the amount of excavation and undercutting, we recommend that a representative of Burns Cooley Dennis, Inc. be present during earthwork operations to evaluate the stability of the soils exposed after stripping and undercutting**.

It should be noted that the on-site fine-grained soils exposed after excavation and undercutting are susceptible to becoming unstable, pumping and rutting excessively under wet conditions. The construction techniques, types of equipment utilized and site drainage provided during construction will have a great effect on the performance of these fine-grained soil types throughout the project. The routing of heavy rubber-tired equipment should be controlled to minimize, as much as possible, traffic over the site. All traffic should be discouraged during periods of inclement weather. If instability, pumping and rutting occur in the fine-grained soils under wet conditions, as a construction expedient it can often be counteracted by treating these materials with hydrated lime. It is estimated that about 4 to 6 percent hydrated lime by dry weight of soil could be required for silty clays (CL) and about 6 to 8 percent hydrated lime by dry weight of soil could be required for clays (CH).

After excavation and undercutting, the exposed CH soils should be evaluated for stability and proofrolled with a loaded dump truck to demonstrate stability before fill materials can be placed to achieve planned grades. **Imported fill soils should consist of select, nonorganic and debris-free silty clays (CL) having a plasticity index (PI) within the range of 10 to 24 and a liquid limit less than 45, and not less than 70 percent fines passing the No. 200 sieve.** Excavated on-site silty clays (CL) can be used as fill materials, provided these soils are dry and meet the requirements discussed in this paragraph. **We do not recommend the use of sands (SC, SM or SP) as fill**. The fill soils should be compacted from lifts not exceeding 9 in. in loose thickness to not less than 95 percent of standard Proctor maximum dry density (ASTM D 698) at moisture contents within 3 percentage points of the optimum water content. Where hand-operated mechanical tampers are used for compaction, the loose lift thickness should be limited to 5 in. Stability must be evident during compaction of each lift before any subsequent lifts of fill material are added. Stability is defined as the absence of significant pumping, rutting or yielding of soils during compaction. As a construction expedient, fill soils that are unstable and/or

pumping due to excessive moisture can be treated with hydrated lime in accordance with recommendations given previously for pumping on-site soils.

Laboratory classification tests, including Atterberg limit determinations and grain-size analyses, should be performed on the imported fill materials initially and routinely during earthwork operations to check for compliance with the recommendations provided herein. Field moisture/density tests should be performed in each compacted lift of fill to assist in evaluating whether the recommended moisture contents and dry densities are being achieved. As a guide for earthwork construction, we suggest one moisture/density test per lift for each 2,500 sq ft of surface area or portion thereof.

Finished site grades should be sloped to promote quick runoff of storm water and provide positive drainage away from the football field on all sides.

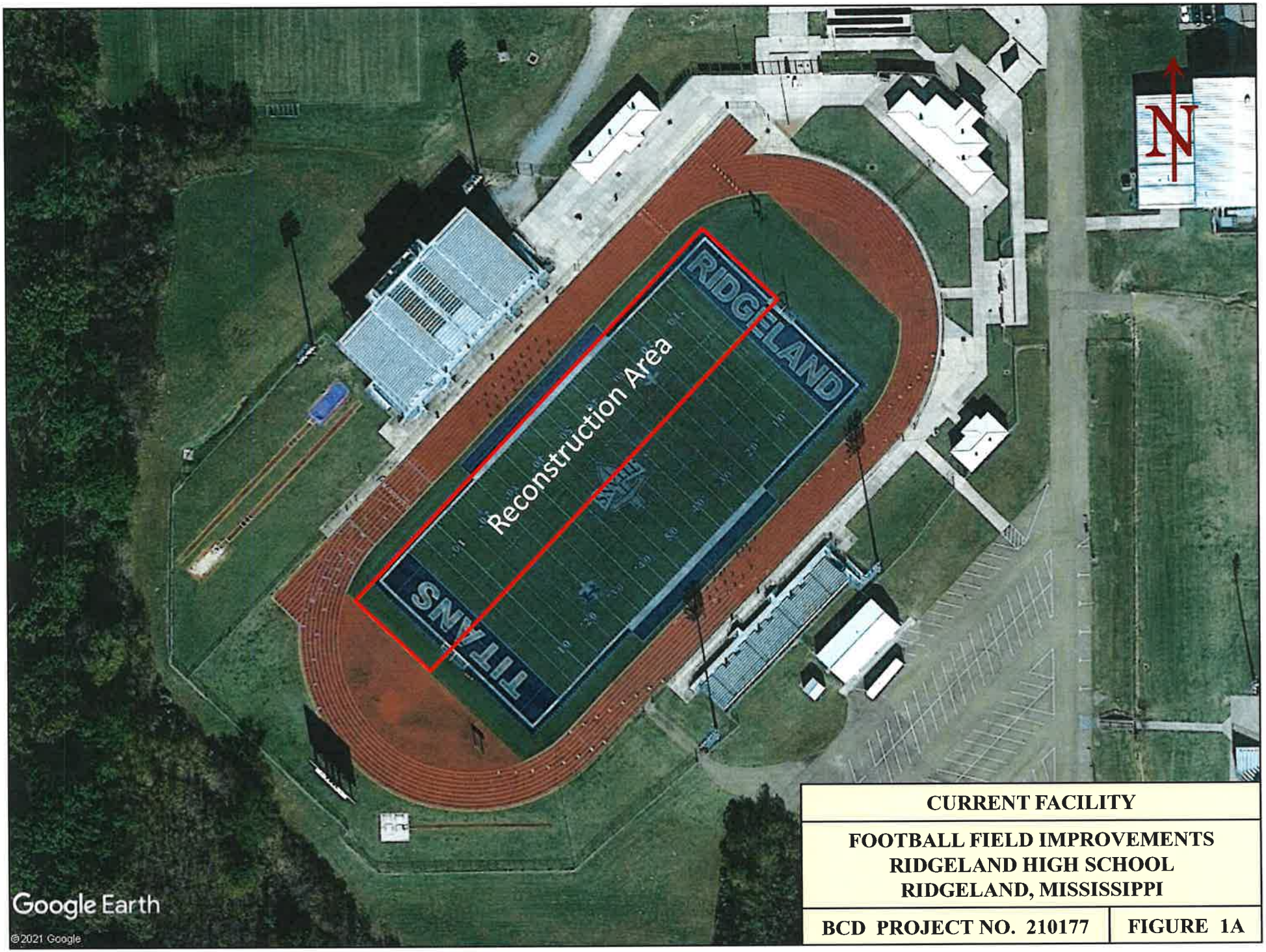
7.0 REPORT LIMITATIONS

The conclusions and recommendations discussed in this report are based on conditions that existed at the time of our field exploration (March 2021) and further on the assumption that the exploratory borings are representative of subsurface conditions throughout the areas explored. It should be noted that actual subsurface conditions between and beyond the borings might differ from those encountered at the boring locations. If subsurface conditions are encountered during construction that vary from those discussed in this report, Burns Cooley Dennis, Inc. should be notified immediately in order that we may evaluate the effects, if any, on earthwork and construction.

Burns Cooley Dennis, Inc. should be retained for a general review of final design drawings and specifications and retained to observe earthwork construction for the project in order to help confirm that our recommendations are valid or to modify them accordingly. Burns Cooley Dennis, Inc. cannot assume responsibility or liability for the adequacy of recommendations if we do not observe construction.

This report has been prepared for the exclusive use of Madison County School District for specific application to the geotechnical-related aspects of earthwork construction for the new synthetic turf football field at Ridgeland High School. The only warranty made by us in connection with the services provided is we have used that degree of care and skill ordinarily exercised under similar conditions by reputable members of our profession practicing in the same or similar locality. No other warranty, express or implied, is made or intended.

FIGURES



CURRENT FACILITY

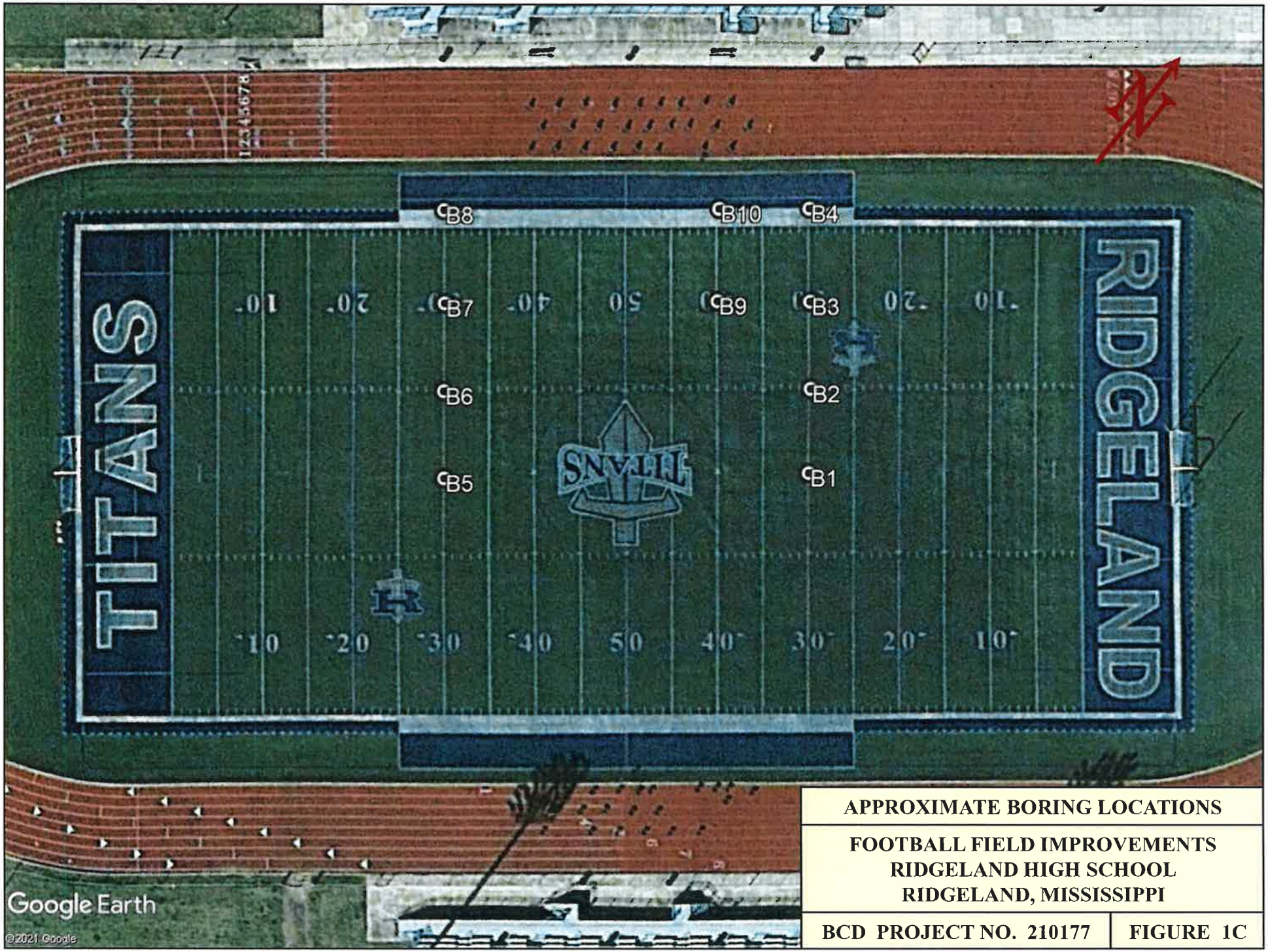
FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

BCD PROJECT NO. 210177	FIGURE 1A

ORIGINAL SITE

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

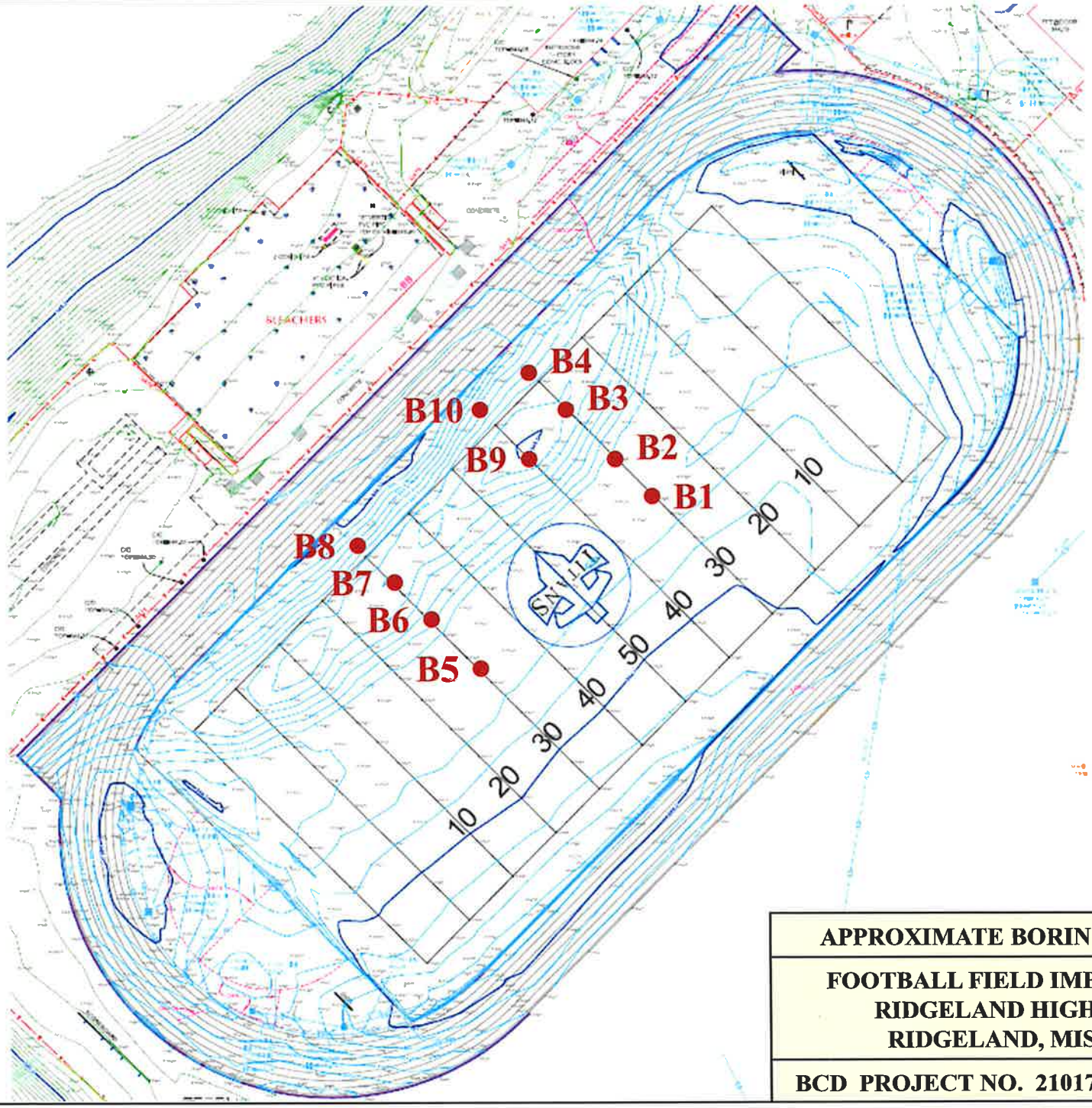
BCD PROJECT NO. 210177 | **FIGURE 1B**



APPROXIMATE BORING LOCATIONS

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

BCD PROJECT NO. 210177	FIGURE 1C



APPROXIMATE BORING LOCATIONS

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

BCD PROJECT NO. 210177	FIGURE 1D

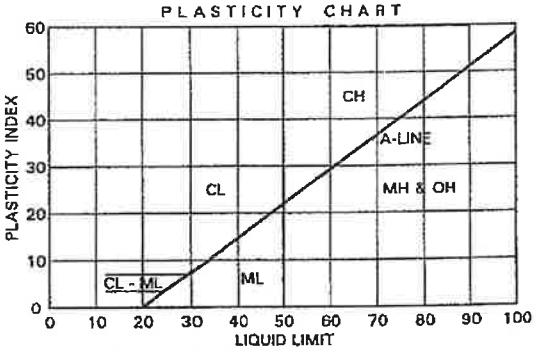
UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			SYMBOL & LETTER	DESCRIPTION
COARSE-GRAINED SOILS More than half of material larger than No. 200 sieve size	GRAVELS More than half of coarse fraction larger than No. 4 sieve size	Clean Gravels (Little or no fines)	GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURE
			GP	POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURE
		Gravels with fines (Appreciable amount of fines)	GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURE
			GC	CLAYEY GRAVEL, GRAVEL-SAND-CLAY MIXTURE
	SANDS More than half of coarse fraction smaller than No. 4 sieve size	Clean Sands (Little or no fines)	SW	WELL GRADED SAND, GRAVELLY SAND
			SP	POORLY GRADED SAND, GRAVELLY SAND
		Sands with fines (Appreciable amount of fines)	SM	SILTY SAND, SAND-SILT MIXTURE
			SC	CLAYEY SAND, SAND-CLAY MIXTURE
FINE-GRAINED SOILS More than half of material smaller than No. 200 sieve	SILTS AND CLAYS	Liquid limit less than 50	ML	SILT WITH LITTLE OR NO PLASTICITY
			ML	CLAYEY SILT, SILT WITH SLIGHT TO MEDIUM PLASTICITY
			CL	SILTY CLAY, LOW TO MEDIUM PLASTICITY
			CL	SANDY CLAY, LOW TO MEDIUM PLASTICITY (30% TO 50% SAND)
	SILTS AND CLAYS	Liquid limit greater than 50	MH	SILT, FINE SANDY OR SILTY SOIL WITH HIGH PLASTICITY
			CH	CLAY, HIGH PLASTICITY
			OH	ORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOIL

TERMS CHARACTERIZING SOIL STRUCTURE

Slickensided	- Clays with polished and striated planes created as a result of volume changes related to shrinking, swelling and/or changes in overburden pressure.
Fissured	- Clays with a blocky or jointed structure generally created by seasonal shrinking and swelling.
Laminated	- Composed of thin alternating layers of varying color and texture.
Calcareous	- Containing appreciable quantities of calcium carbonate.
Parting	- Paper thin (less than 1/8 inch).
Seam	- 1/8 inch to 3 inch thickness.
Layer	- Greater than 3 inches in thickness.

PLASTICITY CHART



FOR CLASSIFICATION OF FINE GRAINED SOILS

DENSITY AND CONSISTENCY

COARSE-GRAINED SOILS		FINE-GRAINED SOILS		
DENSITY	PENETRATION RESISTANCE, N Blows per Foot	CONSISTENCY	COHESION Kips/Sq.Ft	PENETRATION RESISTANCE, N Blows per Foot
Very loose	0 - 4	Very Soft	<0.25	0 - 1
Loose	5 - 10	Soft	0.25 - 0.50	2 - 4
Medium Dense	11 - 30	Medium Stiff	0.50 - 1.00	5 - 8
Dense	31 - 50	Stiff	1.00 - 2.00	9 - 15
Very Dense	>50	Very Stiff	2.00 - 4.00	16 - 30
		Hard	>4.00	>30

PARTICLE SIZE IDENTIFICATION

Cobbles	- Greater than 3 inches
Gravel	- Coarse - 3/4 inch to 3 inches Fine - 4.76 mm to 3/4 inch
Sand	- Coarse - 2 mm to 4.76mm Medium - 0.42 mm to 2 mm Fine - 0.074 mm to 0.42 mm
Silt & Clay	- Less than 0.074 mm

RELATIVE COMPOSITION

Slightly	5 - 15%
With	16 - 29%
Sandy	30 - 50%

(or gravelly)

SAMPLE TYPES
(Shown in Sample Column)

- Shelby Tube
- Split Spoon
- No Recovery
- Auger
- Dennison Barrell

CLASSIFICATION, SYMBOLS AND TERMS USED ON GRAPHICAL BORING LOGS

BURNS COOLEY DENNIS, INC.

FIGURE 2

LOG OF BORING NO. 1

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figures 1C and 1D

DEPTH, ft	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE EL: ±ft	AASHTO	BLOWS PER FT	POCKET PENETROMETER	WATER CONTENT	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	VOLUME CHANGE %	DRY DENSITY, PCF	CBR (EST.)	% PASSING NO. 200 SIEVE
0			Synthetic Turf											
			Stone (6")											
1			Stiff light gray and tan silty clay (CL)				20							
2			- lime treated to 1'				21	42	19	23				
3			- tan and light gray below 2.5'				23							
4							22							
5							20							
6							23	38	24	14				
7							23	41	19	22				
8			Very stiff tan clay (CH)				24	52	15	37				
9							32							
10			(TRANSITIONAL)				30							
11			Very stiff tan clay (CH) - tan and light gray below 11'				28	67	16	51				
12							29							
13			- with calcareous nodules 12.5' to 13.5'				27							
14							35							
15			(WEATHERED YAZOO)				43							
			Boring was completed at 15'											
16														
17														
18														
19														

BORING DEPTH: 15 ft

DATE: 03/20/21

COMMENTS: Synthetic turf with 6" stone drainage layer.

GROUNDWATER DATA: No free water encountered during auger drilling on 3/20/21. Free water observed at an approximate depth of 5.3' on 3/22/21.

210177

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 3

LOG OF BORING NO. 2

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figures 1C and 1D

DEPTH, ft	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE EL: ±ft	AASHTO	BLOWS PER FT	POCKET PENETROMETER	WATER CONTENT	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	VOLUME CHANGE %	DRY DENSITY, PCF	CBR (EST.)	% PASSING NO. 200 SIEVE
0			Synthetic Turf											
			Stone (6")											
1			Medium stiff light gray and tan silty clay (CL) - damp 0.5' to 1.5' - stiff 1.5' to 2.5' - tan and light gray below 1.5' - very stiff below 3'				24	37	19	18				
2							23							
3							25	36	21	15				
4							21							
5							22							
6			Very stiff tan and light gray clay (CH)				25	61	17	44				
			(TRANSITIONAL)				33	82	20	62				
7			Very stiff tan and light gray clay (CH) - with calcareous nodules 7' to 11'				41							
8														
9							28							
10							28	69	16	53				
11							40	91	21	70				
12							47							
13			(WEATHERED YAZOO)				46							
14							46							
15							43	107	24	83				
			Boring was completed at 15'											
16														
17														
18														
19														

BORING DEPTH: 15 ft

DATE: 03/20/21

COMMENTS: Synthetic turf with 6" stone drainage layer.

GROUNDWATER DATA: No free water encountered during auger drilling on 3/20/21. Free water observed at an approximate depth of 5.3' on 3/22/21.

210177

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 4

LOG OF BORING NO. 3

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figures 1C and 1D

DEPTH, ft	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE EL: ±ft	AASHTO	BLOWS PER FT	POCKET PENETROMETER	WATER CONTENT	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	VOLUME CHANGE %	DRY DENSITY, PCF	CBR (EST.)	% PASSING NO. 200 SIEVE
0			Synthetic Turf											
			Stone (6")											
1			Medium stiff light gray and tan silty clay (CL) - lime treated to 1'				23	36	21	15				
2							26							
3			- wet at 3' - with organics 3' to 4'				27	38	22	16				
4							28							
5			- stiff below 4.5"				25							
6							25	46	15	31				
7			Very stiff tan and light gray clay (CH)				28	71	17	54				
8			- with calcareous nodules below 8'				38	96	22	74				
9							36							
10			(WEATHERED YAZOO)				44							
			Boring was completed at 10'											
11														
12														
13														
14														
15														
16														
17														
18														
19														

BORING DEPTH: 15 ft

DATE: 03/20/21

COMMENTS: Synthetic turf with 6" stone drainage layer.

GROUNDWATER DATA: Free water encountered at an approximate depth of 3' during auger drilling on 3/20/21. Free water observed at an approximate depth of 1.0' on 3/22/21.

210177

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 5

LOG OF BORING NO. 4

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figures 1C and 1D

DEPTH, ft	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE EL: ±ft	AASHTO	BLOWS PER FT	POCKET PENETROMETER	WATER CONTENT	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	VOLUME CHANGE %	DRY DENSITY, PCF	CBR (EST.)	% PASSING NO. 200 SIEVE
0			Synthetic Turf											
0			Stone (6")											
1			Stiff light gray and tan silty clay (CL)				23							
2			- lime treated to 1' - damp and soft below 1.5'				27	36	20	16				
3			Medium stiff tan clay (CH)				27	56	18	38				
4			- very stiff below 4'				26							
5			(TRANSITIONAL)				23							
6			Very stiff tan and light gray clay (CH)				40	97	24	73				
7			- with calcareous nodules 6.5' to 8.5'				31							
8							33	89	20	69				
9							42							
10							45							
11							48	113	25	88				
12							53							
13			(WEATHERED YAZOO)				41							
14							41							
15							39	97	25	72				
15			Boring was completed at 15'											
16														
17														
18														
19														

BORING DEPTH: 15 ft

DATE: 03/20/21

COMMENTS: Synthetic turf with 6" stone drainage layer.

GROUNDWATER DATA: No free water encountered during auger drilling on 3/20/21. No free water observed on 3/22/21.

210177

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 6

LOG OF BORING NO. 5

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figures 1C and 1D

DEPTH, ft	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE EL: ±ft	AASHTO	BLOWS PER FT	POCKET PENETROMETER	WATER CONTENT	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	VOLUME CHANGE %	DRY DENSITY, PCF	CBR (EST.)	% PASSING NO. 200 SIEVE
0			Synthetic Turf											
0			Stone (6")											
1			Stiff light gray and tan silty clay (CL)				23							
2							21	39	17	22				
3			- tan and light gray below 3'				22							
4							25							
5							26							
6							22	39	20	19				
7							23	45	17	28				
8			Very stiff tan and light gray clay (CH)				37	88	21	67				
9			- tan 8.5' to 10.5				31							
10							30							
11			- with calcareous nodules 10.5' to 12'				30	82	19	63				
12							36							
13							31							
14			(WEATHERED YAZOO)				28							
15							30							
15			Boring was completed at 15'											
16														
17														
18														
19														

BORING DEPTH: 15 ft

DATE: 03/20/21

COMMENTS: Synthetic turf with 6" stone drainage layer.

GROUNDWATER DATA: No free water encountered during auger drilling on 3/20/21. Borehole sloughed at an approximate depth of 8.5' on 3/22/21.

210177

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 7

LOG OF BORING NO. 6

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figures 1C and 1D

DEPTH, ft	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE EL: ±ft	AASHTO	BLOWS PER FT	POCKET PENETROMETER	WATER CONTENT	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	VOLUME CHANGE %	DRY DENSITY, PCF	CBR (EST.)	% PASSING NO. 200 SIEVE
0			Synthetic Turf											
			Stone (6")											
1			Medium stiff light gray and tan silty clay (CL) - lime treated to 1'				24	35	21	14				
2			- damp 1.5' to 2.5'				27							
3			- very stiff, tan and light gray below 3'				24	36	20	16				
4							20							
5							23							
6			Very stiff tan and light gray clay (CH)				24	53	17	36				
			(TRANSITIONAL)				34	75	20	55				
7			Very stiff tan and light gray clay (CH)				34							
8			- with calcareous nodules 7.5' to 9'				28							
9							30							
10							28	63	17	46				
11							30							
12							28							
13							26							
14			(WEATHERED YAZOO)				32	79	21	58				
15			Boring was completed at 15'											
16														
17														
18														
19														

BORING DEPTH: 15 ft

DATE: 03/20/21

COMMENTS: Synthetic turf with 6" stone drainage layer.

GROUNDWATER DATA: No free water encountered during auger drilling on 3/20/21. No free water observed on 3/22/21.

210177

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 8

LOG OF BORING NO. 7

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figures 1C and 1D

DEPTH, ft	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE EL: ±ft	AASHTO	BLOWS PER FT	POCKET PENETROMETER	WATER CONTENT	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	VOLUME CHANGE %	DRY DENSITY, PCF	CBR (EST.)	% PASSING NO. 200 SIEVE
0			Synthetic Turf											
			Stone (6")											
1			Medium stiff light gray silty clay (CL)				24	36	20	16				
2			- very damp, wet at 2'				29							
3							27	35	22	13				
4			- very stiff, tan and light gray 3.5' to 5.5'				25							
5							24							
6							24	48	17	31				
7			Very stiff tan clay (CH) (TRANSITIONAL)				26	50	16	34				
8			Very stiff tan and light gray clay (CH) with calcareous nodules				28	66	17	49				
9							27	66	18	48				
10			(WEATHERED YAZOO)				23							
			Boring was completed at 10'											
11														
12														
13														
14														
15														
16														
17														
18														
19														

BORING DEPTH: 15 ft

DATE: 03/20/21

COMMENTS: Synthetic turf with 6" stone drainage layer.

GROUNDWATER DATA: Free water encountered at an approximate depth of 2.5' during auger drilling on 3/20/21. Free water observed at an approximate depth of 0.5' on 3/22/21.

210177

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 9

LOG OF BORING NO. 8

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figures 1C and 1D

DEPTH, ft	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE EL: ±ft	AASHTO	BLOWS PER FT	POCKET PENETROMETER	WATER CONTENT	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	VOLUME CHANGE %	DRY DENSITY, PCF	CBR (EST.)	% PASSING NO. 200 SIEVE
0			Synthetic Turf											
			Stone (6")											
1			Medium stiff light gray silty clay (CL) - lime treated to 1' - damp 1.5' to 2.5'				25	37	22	15				
2							26							
3							23	41	16	25				
4							25							
5							24							
6			Very stiff tan and light gray clay (CH)				46	95	24	71				
7			- with calcareous nodules 6.5' to 8'				26							
8							37	92	20	72				
9							41							
10							43							
11							44	107	24	83				
12							45							
13			(WEATHERED YAZOO)				42							
14							45							
15			Boring was completed at 15'				45							
16														
17														
18														
19														

BORING DEPTH: 15 ft

DATE: 03/20/21

COMMENTS: Synthetic turf with 6" stone drainage layer.

GROUNDWATER DATA: No free water encountered during auger drilling on 3/20/21. No free water observed on 3/22/21.

210177

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 10

LOG OF BORING NO. 9

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figures 1C and 1D

DEPTH, ft	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE EL: ±ft	AASHTO	BLOWS PER FT	POCKET PENETROMETER	WATER CONTENT	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	VOLUME CHANGE %	DRY DENSITY, PCF	CBR (EST.)	% PASSING NO. 200 SIEVE
0			Synthetic Turf											
			Stone (6")											
1			Medium stiff light gray and tan silty clay (CL)				25							
2			- damp 6" to 1.5'				29	36	20	16				
3			- wet at 2'				27	36	22	14				
4							24							
5							26							
6			Very stiff tan and light gray clay (CH)				27	65	16	49				
7			- with calcareous nodules 7' to 10'				27							
8							40	91	20	71				
9			(WEATHERED YAZOO)				41							
10			Boring was completed at 0'				35							
11														
12														
13														
14														
15														
16														
17														
18														
19														

BORING DEPTH: 15 ft

DATE: 03/20/21

COMMENTS: Synthetic turf with 6" stone drainage layer.

GROUNDWATER DATA: Free water encountered at an approximate depth of 2' during auger drilling on 3/20/21. Free water observed at an approximate depth of 0.5' on 3/22/21.

210177

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 11

LOG OF BORING NO. 10

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

TYPE: 4" Short-flight auger

LOCATION: See Figures 1C and 1D

DEPTH, ft	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE EL: ±ft	AASHTO	BLOWS PER FT	POCKET PENETROMETER	WATER CONTENT	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	VOLUME CHANGE %	DRY DENSITY, PCF	CBR (EST.)	% PASSING NO. 200 SIEVE
0			Synthetic Turf											
			Stone (6")											
1			Stiff light gray and tan silty clay (CL) - lime treated to 1'				24	35	21	14				
2			- medium stiff, damp 1.5' to 2.5'				28							
3							24	41	20	21				
4							24							
5			Very stiff tan and light gray clay (CH)				28							
6			(TRANSITIONAL)				27	59	16	43				
7			Very stiff tan and light gray clay (CH) - with calcareous nodules 6.5' to 7.5'				26							
8							46	111	25	86				
9							49							
10			(WEATHERED YAZOO)				44							
11							43							
12							42							
13							46	108	27	81				
14							44							
15			Boring was completed at 15'				41							
16														
17														
18														
19														

BORING DEPTH: 15 ft

DATE: 03/20/21

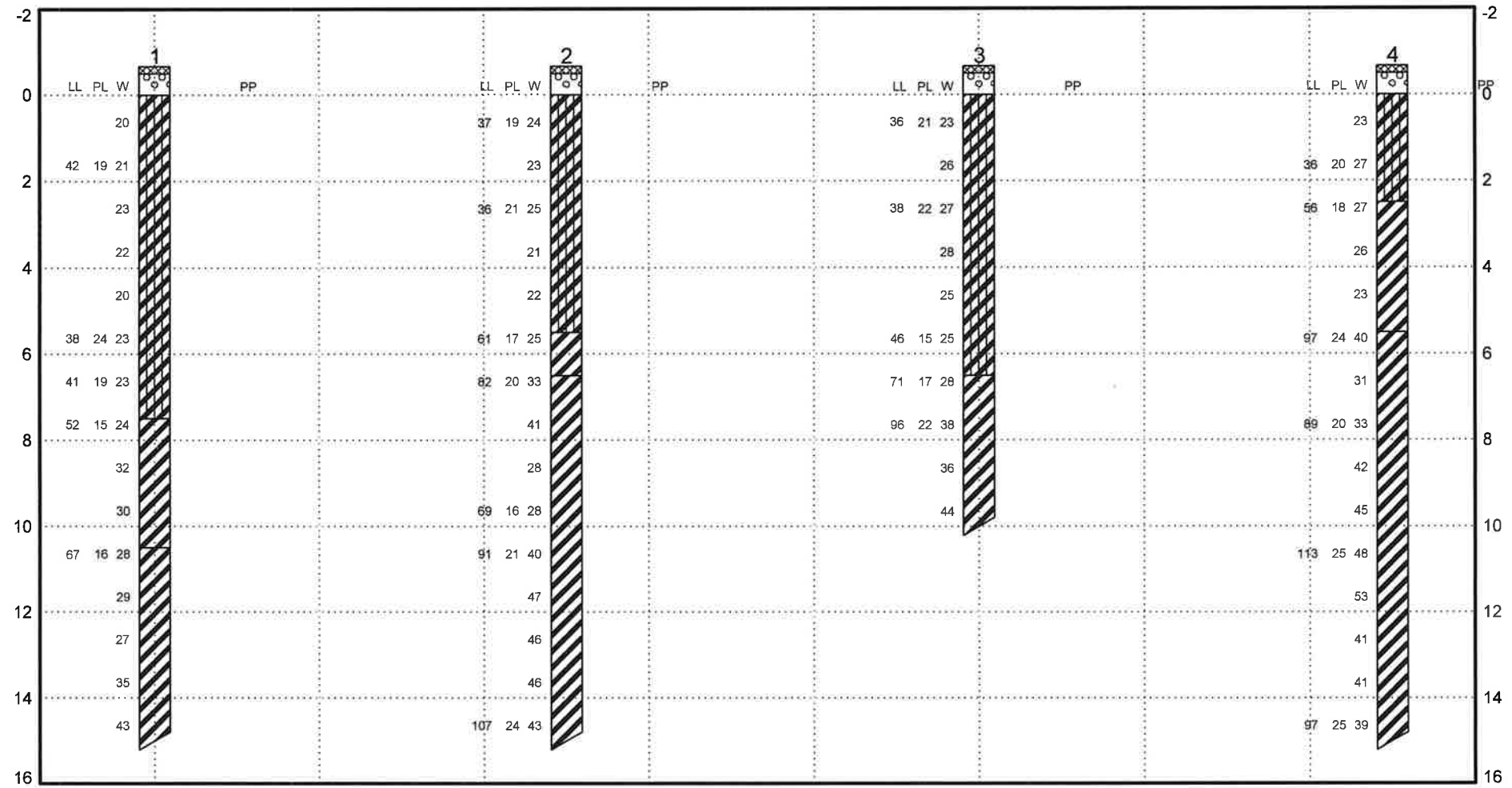
COMMENTS: Synthetic turf with 6" stone drainage layer.

GROUNDWATER DATA: No free water encountered during auger drilling on 3/20/21. No free water observed on 3/22/21.

210177

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

FIGURE 12



LEGEND:

LL = Liquid Limit
PL = Plastic Limit
W = Water Content
DD = Dry Density (pcf)
C/N = Cohesion (ksf)/Penetration Resistance, N (blows/ft) in the same column
MS = Matric Suction (tsf)
%-200 = % Passing No. 200 Sieve

NOTE: See Figure 2 for boring log legend.

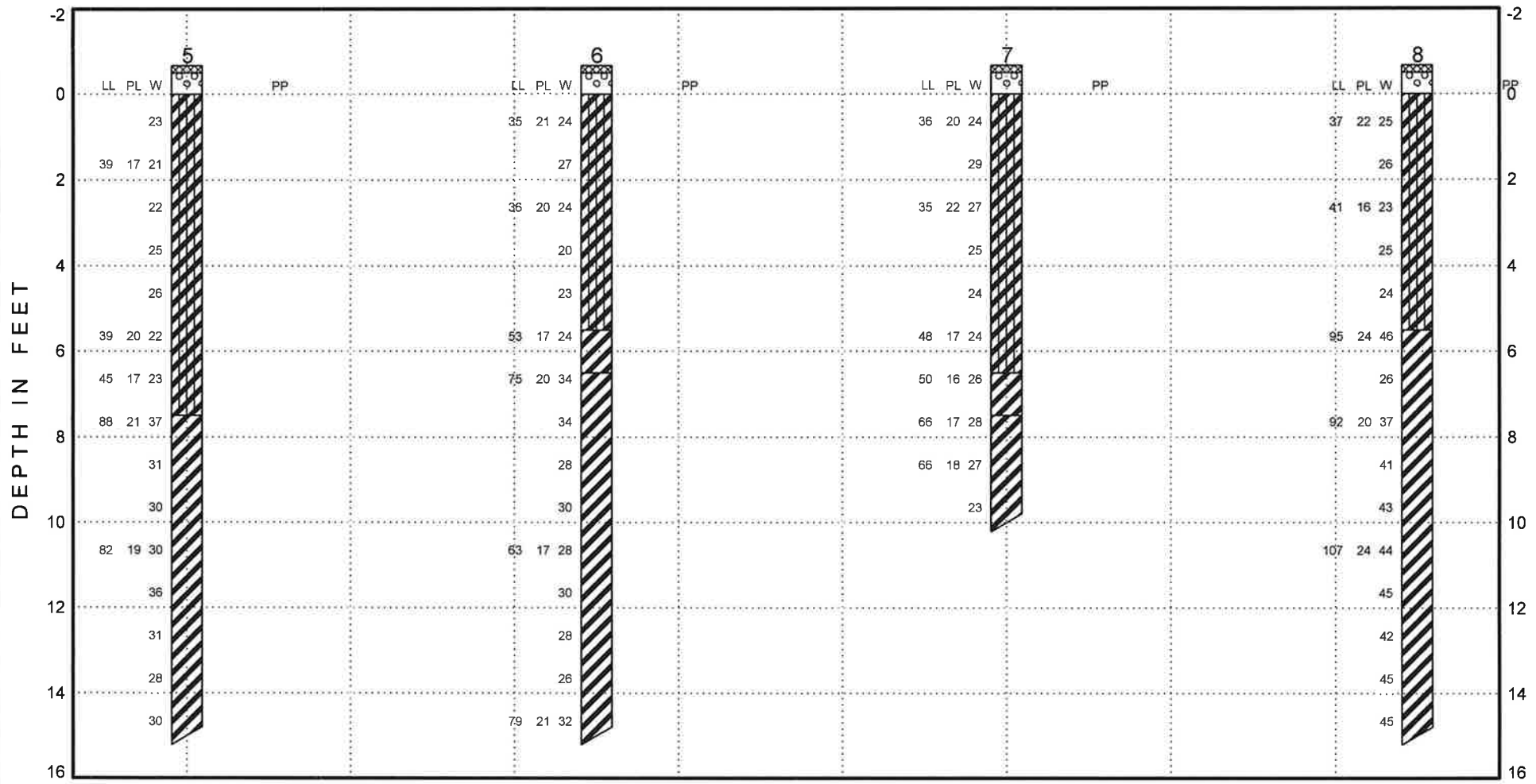
SUBSURFACE SOIL PROFILE

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

Job No.	Date	Figure
210177	4/21/21	13

GENERIC FENCE WITH DEPTH OFFSET WO -200

BURNS COOLEY DENNIS, INC.



LEGEND:

LL = Liquid Limit
PL = Plastic Limit
W = Water Content
DD = Dry Density (pcf)
C/N = Cohesion (ksf)/Penetration Resistance, N (blows/ft) in the same column
MS = Matric Suction (tsf)
%-200 = % Passing No. 200 Sieve

NOTE: See Figure 2 for boring log legend.

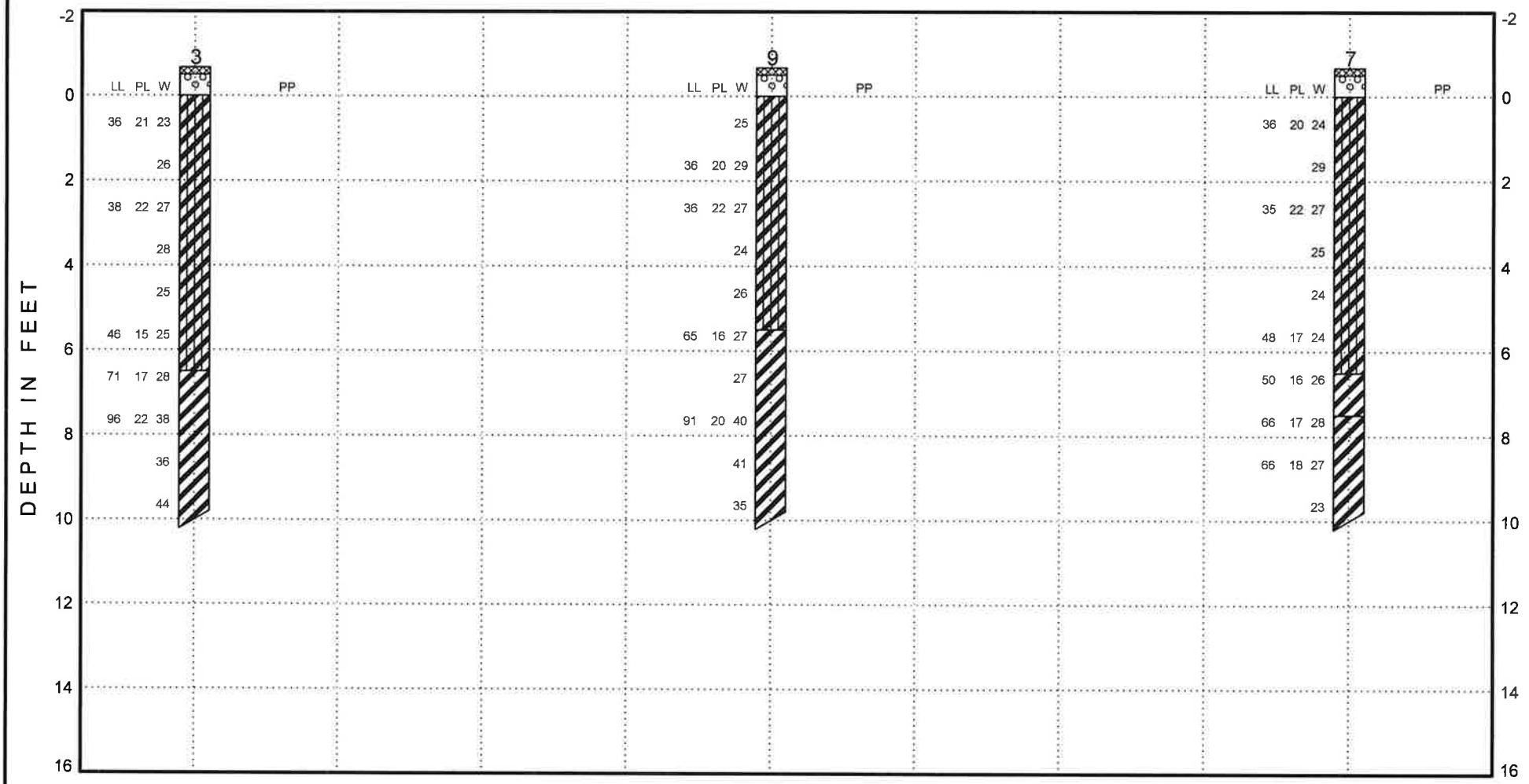
SUBSURFACE SOIL PROFILE

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

Job No.	Date	Figure
210177	4/21/21	14

GENERIC FENCE WITH DEPTH OFFSET WO -300

BURNS COOLEY DENNIS, INC.



LEGEND:

LL = Liquid Limit
PL = Plastic Limit
W = Water Content
DD = Dry Density (pcf)
C/N = Cohesion (ksf)/Penetration Resistance, N (blows/ft) in the same column
MS = Matric Suction (tsf)
%-200 = % Passing No. 200 Sieve

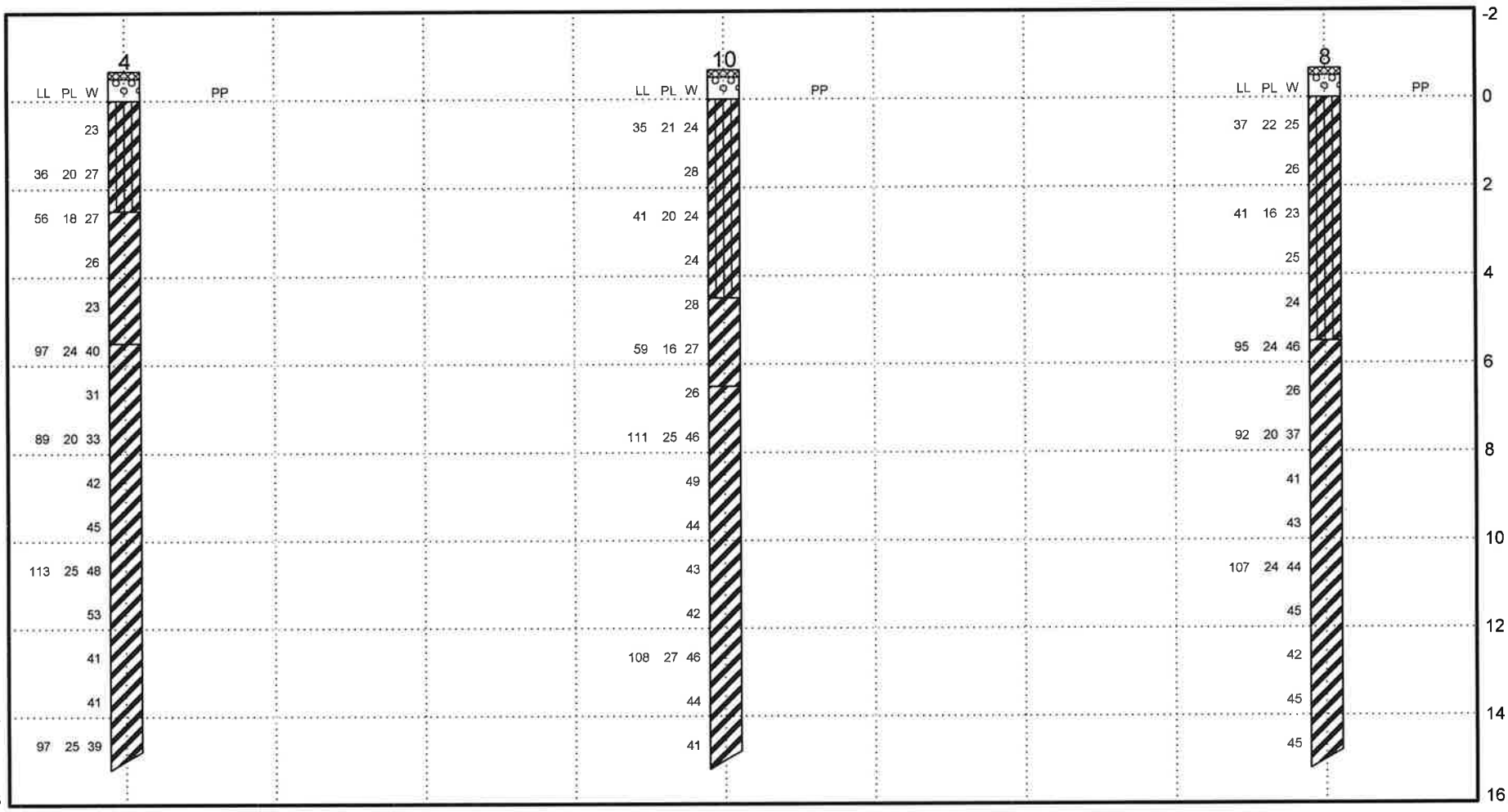
NOTE: See Figure 2 for boring log legend.

SUBSURFACE SOIL PROFILE

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

Job No.	Date	Figure
210177	4/21/21	15

GENERIC FENCE WITH DEPTH OFFSET WO -200



LEGEND:

LL = Liquid Limit
PL = Plastic Limit
W = Water Content
DD = Dry Density (pcf)
C/N = Cohesion (ksf)/Penetration Resistance, N (blows/ft) in the same column
MS = Matric Suction (tsf)
%-200 = % Passing No. 200 Sieve

NOTE: See Figure 2 for boring log legend.

SUBSURFACE SOIL PROFILE

FOOTBALL FIELD IMPROVEMENTS
RIDGELAND HIGH SCHOOL
RIDGELAND, MISSISSIPPI

Job No.	Date	Figure
210177	4/21/21	16