SECTION 11 24 23

FALL PROTECTION ANCHORS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: This Section specifies design, supply and installation of fall protection anchors.

1.02 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

1.04 ACTION SUBMITTALS

A. Shop Drawings: Indicate information on shop drawings as follows:
   1. Submit shop drawings and calculations showing complete layout and configuration of fall protection anchors.
   2. Shop drawings and calculations shall be signed and sealed by Engineer licensed in State of Virginia.

B. Submit product data, including manufacturer's technical data sheet, for specified products.

1.05 INFORMATION SUBMITTALS

A. Quality Assurance:
   1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
   2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
   3. Manufacturer's installation instructions.

1.06 CLOSEOUT SUBMITTALS

A. Submit 1-year standard manufacturer warranty documents specified.

B. Operation and Maintenance Data: Submit Operation and Maintenance data for installed products.
   1. Include:
      a. Manufacturer's instructions covering maintenance requirements and parts catalog giving complete list of repair and replacement parts with cuts and identifying numbers.

C. Regulatory Requirements.

   1. Comply with International Building Code (IBC).
   2. Comply with OSHA regulations as follows:
      a. 1910, Subpart D, Walking and Working Surfaces.
      b. Appendix C to 1910 Subpart F, Personal Fall Arrest Systems.

D. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.08 DELIVERY, STORAGE AND HANDLING

A.. Delivery:
1. Deliver materials in manufacturer's original packaging with identification labels intact and in sizes to suit project.

B. Storage and Protection:
1. Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.09 WARRANTY

A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Ensure manufacturer has minimum 5years experience in manufacturing window washing and suspended maintenance system components similar to or exceeding requirements of project.

2.02 BASIS OF DESIGN

A. Manufacturer: Pro-Bel Group of Companies.

2.03 DESIGN PERFORMANCE REQUIREMENTS

A. Locate anchorages to suit suspension equipment specified.

B. Design system fall arrest safety anchors and equipment supports to AISC S342L (including supplement No.1) and ANSI/IWCA I-14.1, and as follows:
1. Comply with OSHA 1910, Subpart F, Appendix C.
2. Fall Arrest Safety Anchors:
a. Fall arresting force safety factor of 2 to 1 without permanent deformation: 1800lbs minimum.

2.04 not used.

2.05 ANCHORS

A. Safety U-bars: Mild steel, Type 300W with 44Ksi (300MPa) minimum yield strength, hot-dip galvanized to ASTM A123/A123M.
1. U-bar: 0.75 inches (19mm) minimum diameter material with 1.5 inches (38mm) eye opening.

B. Safety Anchor Eye Plate: Mild steel, Type 300W with 44Ksi (300MPa) minimum yield strength, hot-dip galvanized to ASTM A123/A123M.
1. Plate: 0.875 inches (22mm) diameter material with 2inches (50mm) eye opening.

C. Hollow Steel Section (HSS) Piers: Mild steel, Type 300W with 50Ksi (350MPa) minimum yield strength, hot dipped galvanized to ASTM A123/A123M.
1. Wall thickness to suit application.
2. Height: Minimum 30" above steel beam.

E. Plate and other sections: Mild steel, Type 300W with 44Ksi (300MPa) minimum yield strength, hot dipped galvanized to ASTM A123/A123M.
   1. Wall thickness to suit application.

G. Miscellaneous Bolts, Nuts and Washers: [Mild steel, Type 300W with 44Ksi (300MPa) minimum yield strength, hot-dip galvanized to ASTM A123/A123M.

PART 3 EXECUTION

3.01 INSTALLERS

A. Weld to AWS D1.2/D1.2M.

B. not used.

3.02 not used.

3.03 EXAMINATION

A. Site Verification of Conditions:

1. Verify that substrate conditions which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of window washing equipment.
2. Inform Architect of unacceptable conditions immediately upon discovery.
3. Proceed with installation only after unacceptable conditions have been remedied.

3.04 PREPARATION

A. Ensure structure or substrate is adequate to support complete window washing equipment system.

B. Ensure structural steel to receive safety anchors has adequate bearing surface as indicated on shop drawings.

3.05 INSTALLATION

A. Fasten anchors in accordance with manufacturer's recommendations.

D. Accurately fit and align, securely fasten and install free from distortion or defects.

E. Deform threads of tail end of anchor studs after nuts have been tightened to prevent accidental removal and vandalism.

3.06 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Have manufacturer's technical representative schedule site visits to review work upon completion.

END OF SECTION 11 24 23

SECTION 32 31 13

CHAIN LINK FENCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Chain-link fences, vinyl coated
   a. Match height of existing fence at track perimeter.

B. Related Requirements:

1. Section 033013 "Concrete" for cast-in-place concrete, concrete walls and post footings.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:

   a. Fence posts, rails, and fittings.
   b. Chain-link fabric, reinforcements, and attachments.

B. Shop Drawings: For each type of fence and netting assembly.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Include accessories and hardware.
3. Include grounding requirements and details.

C. Samples for Verification: For each type of component with factory-applied finish, prepared on Samples of size indicated below:

1. Polymer-Coated Components: In 6-inch lengths for components and on full-sized units for accessories.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For factory-authorized service representative or professional engineer.

B. Product Certificates: For each type of chain-link fence.

C. Product Test Reports: For framework strength according to ASTM F1043, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fencing systems

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing fence grounding; member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences shown on Drawings in relation to adjacent improvements. Verify dimensions by field measurements.

1.9 WARRANTY

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Chain-link fence and gate frameworks shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to ASCE/SEI 7.

1. Design Wind Load: 80 mph

B. Lightning Protection System: Maximum resistance-to-ground value of 25 ohms at each grounding location along fence under normal dry conditions.

2.2 MANUFACTURERS

A. Manufacturer for chain link fencing: basis of design: Master Halco

1. Type: Color chain link fencing
   a. Product: Permafused; fused and adhered vinyl coating

2.3 CHAIN-LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist according to "CLFMI Product Manual" and requirements indicated below:

1. Fabric Height: As indicated on Drawings.
2. Steel Wire for Fabric: 8 gauge finish with 9 gauge wire core, or equivalent to match existing fence.

   a. Mesh Size: match existing
   b. Polymer-Coated Fabric: ASTM F668, Class 2a, over zinc or Zn-5-Al-MM-alloy-coated steel wire.

      1) Color: Black, according to ASTM F934.

   c. Coat selvage ends of metallic-coated fabric before the weaving process with manufacturer's standard clear protective coating.

3. Selvage: Knuckled at both selvages; knuckle/knuckle, no pointed prongs

2.4 FENCE FRAMEWORK

A. Posts and Rails: ASTM F1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F1043 based on the following:

1. Fence Height: Match existing track perimeter fence.
2. Light-Industrial-Strength Material

3. Horizontal Framework Members: top rails according to ASTM F1043.

2.5 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout, recommended in writing by manufacturer, for exterior applications.

B. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, and that is recommended in writing by manufacturer for exterior applications.

2.6 GROUNDING MATERIALS

A. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Connectors and Grounding Rods: Listed and labeled for complying with UL 467.

1. Connectors for Below-Grade Use: Exothermic welded type.
2. Grounding Rods: Copper-clad steel, 5/8 by 96 inches (16 by 2440 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.

1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet (152 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 CHAIN-LINK FENCE INSTALLATION

A. Install chain-link fencing according to ASTM F567 and more stringent requirements specified.

1. Install fencing on established boundary lines inside property line.

B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
    a. Posts Set into Sleeves in Concrete: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout oranchoring cement, mixed and placed according to anchoring material manufacturer's written instructions. Finish anchorage joint to slope away from post to drain water.
    b. Posts Set into Holes in Concrete: Form or core drill holes not less than 5 inches (127 mm) deep and 3/4 inch (20 mm) larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout oranchoring cement, mixed and placed according to anchoring material manufacturer's written instructions. Finish anchorage joint to slope away from post to drain water.

C. Chain-Link Fabric: Apply fabric to field side of enclosing framework. Leave **2-inch** bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull

fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

D. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts, with tension bands spaced not more than 15 inches o.c.

E. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric according to ASTM F626. Bend ends of wire to minimize hazard to individuals and clothing.

1. Maximum Spacing: Tie fabric to line posts at 12 inches (300 mm) o.c. and to braces at 24 inches (610 mm) o.c.

F. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

3.4 GROUNDING AND BONDING

A. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Fence Post Grounding:
1. Fences within 100 Feet (30 m) of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 feet (225 m).
2. Ground fence on each side of fence openings.

C. Connections:

1. Make connections with clean, bare metal at points of contact.
2. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
3. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
4. Make above-grade ground connections with mechanical fasteners.
5. Make below-grade ground connections with exothermic welds.
6. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests.

B. Grounding Tests: Comply with requirements in Section 264113 "Lightning Protection for Structures."

C. Prepare test reports.

3.6 ADJUSTING

A. Lubricate hardware and other moving parts.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain chain-link fences and gates.

END OF SECTION 32 31 13

SECTION 32 33 00

SITE FURNISHINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes
   1. Tables
   2. Chairs

1.3 ACTION SUBMITTALS

A. Product Data: Manufacturers product data for each type of product.

B. Samples for Verification: For each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Installation manuals

B. Maintenance manuals

PART 2 - PRODUCTS

2.1 TABLE

A. Products: Subject to compliance with requirements, provide the following:
   1. Manufacturer: LandscapeForms
      a. Product name: Tables – Steelhead Perforated
      b. Size: 42” Round Top
      c. Color: TBD from Manufactuer’s Full Range
      d. Options: Umbrella Hole
      e. Base: Catena Freestanding Support
      f. Installation: Freestanding

2.2 CHAIR

A. Products: Subject to compliance with requirements, provide the following:
   1. Manufacturer: LandscapeForms
      a. Product name: Chipman Chair – With Arms
      b. Color: TBD from Manufactuer’s Full Range

c. Installation: Freestanding

PART 3 - EXECUTION

3.1 INSTALLATION

1. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.
2. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
3. Install site furnishings level, plumb, true, and securely anchored or positioned at locations indicated on Drawings.

END OF SECTION 12 93 00

SECTION 32 91 13

SOIL PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes planting soils specified by composition of the mixes.

B. Related Requirements:
1. Section 32 93 00 "Plants and Planting" for plant installation
2. Section 32 92 00 “Turf and Grasses” for seeded and sodded lawns

1.3 DEFINITIONS

A. Imported Soil: Soil that is transported to Project site for use.

B. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.

C. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

D. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

E. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

F. Imported Soil: Soil that is transported to Project site for use.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each bulk-supplied material, 1-quart. volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed, and will provide recommendations for soil amendments.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing on-site soil, imported soil and compost. .

B. Preconstruction Soil Analyses: For each unamended soil type and for each planting soil type, perform testing on soil samples and furnish soil analysis and **a written report containing soil-amendment and fertilizer recommendations** by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.

1.8 EXISTING SOIL-SAMPLING REQUIREMENTS

A. General: Extract soil samples according to requirements in this article.

B. Sample Collection and Labeling: Have samples taken and labeled by state-certified, -licensed, or -registered soil scientist or landscape contractor under the direction of the testing agency.

1. Number and Location of Samples:
   a. After rough grading is complete and at subgrade elevation and before placement of planting soil, collect a minimum of five representative soil samples at major planting areas.
   b. Collect two samples from any stockpiled soil to be used or amended for landscaping purposes. Provide two samples from each 500 CY of stockpiled soil.
2. Procedures and Depth of Samples: per instructions from the testing laboratory.
3. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.9 IMPORTED SOIL AND COMPOST TESTING

A. Provide soil test results and recommendations for all imported topsoil, manufactured planting soil and compost per Testing Requirements article.
   1. If planting soil is mixed on site, provide one test of soil after blending.

B. Provide soil test and recommendations for each 500 CY of imported topsoil and manufactured planting soil.

1.10 TESTING REQUIREMENTS

A. General: Perform tests on soil samples according to requirements in this article.

B. Physical Testing:

1. Soil Texture: Soil-particle, size-distribution analysis by one of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":

    a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
    b. Hydrometer Method: Report percentages of sand, silt, and clay.
2. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

C. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of , including the following:

1. Percentage of organic matter.
2. CEC, calcium percent of CEC, and magnesium percent of CEC.
3. Soil reaction (acidity/alkalinity pH value).
4. Buffered acidity or alkalinity.
5. Nitrogen ppm.
6. Phosphorous ppm.
7. Potassium ppm.
8. Manganese ppm.
9. Manganese-availability ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm.
14. Soluble-salts ppm.
15. Other deleterious materials, including their characteristics and content of each.

D. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

E. Recommendations: *Based on the test results, state recommendations for soil treatments and soil amendments* to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, potassium, and phosphorous fertilization, and for micronutrients. Provide recommendations for addition of organic compost in lieu of inorganic fertilizer.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inchdepth of soil .
2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. for 6-inch depth of soil . Recommend alternative organic amendments for modifying soil pH.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet or frozen.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Regional Materials: Imported soil, manufactured planting soil and soil amendments and fertilizers shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

2.2 TOPSOIL

A. Imported, naturally formed soil from off-site sources and consisting of sandy loam or loam soil according to USDA textures.

B. Sources: Take imported, unamended soil from sources that are naturally well-drained sites where topsoil occurs at least 4 inches deep, not from agricultural land, bogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, but not limited to, quackgrass, Jonsongrass, posion ivy, nutsedge, nimblewill, Canda thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass.

C. Additional Properties of Imported topsoil before Amending: Soil reaction of pH 6 to 7 and minimum of 2 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.

2.3 PLANTING SOILS SPECIFIED BY COMPOSITION

A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.

1. Planting-Soil Type: Tree Planting: Blend existing, on-site surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil

    a. Mix one half (1/2) existing on-site surface soil if suitable with one quarter (1/4) imported topsoil and one quarter (1/4) compost by volume with additional amendments per soil test recommendations. If existing soil is not suitable, use 1/3 existing soil, 1/3 imported topsoil, 1/3 compost by volume.

2. Planting-Soil Type: Shrub Planting: For placement in continuous planting soil beds.

    a. Same as Tree Planting

3. Planting-Soil Type: Lawn Planting: For placement in continuous planting soil beds.

    a. Mix ¾ topsoil and ¼ compost with additional amendments per soil test recommendations.

2.4 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
3. Form: Provide lime in form of ground dolomitic limestone.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.

E. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C 33/C 33M .

2.5 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock or yard waste, and bearing USCC's "Seal of Testing Assurance," and as follows:
1. Reaction: pH of 5.5 to 8 .
2. Soluble-Salt Concentration: Less than 4 dS/m.
3. Moisture Content: 35 to 55 percent by weight.
4. Carbon:Nitrogen Ratio: less than 25:1
5. Organic-Matter Content: 30 to 40 percent of dry weight.
6. Particle Size: Minimum of 98 percent passing through a 2-inch sieve.

2.6 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, and potassium in the following composition:
1. Composition: Nitrogen, potassium, and phosphorous in amounts recommended in soil reports from a qualified testing agency.
2. A single fertilizer application may not exceed 0.9 pound total nitrogen per 1,000 sq ft which can include no more than 0.7 pound of soluble nitrogen per 1,000 sq ft.

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, and potassium in the following composition:
   1. Composition: Nitrogen, potassium, and phosphorous in amounts recommended in soil reports from a qualified testing agency.

C. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 GENERAL

A. Place planting soil and fertilizers according to requirements in other Specification Sections.

B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

A. Excavation: Excavate soil from designated area(s) and stockpile until amended.

B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.

C. Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.

D. Screening: Pass unamended soil through a 2-inch sieve to remove large materials.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Subgrade Preparation: Till subgrade to a minimum depth of 6 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

C. Mixing: Spread unamended soil to total depth of 8 inches, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.

   1. Amendments: Apply soil amendments and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.

      a. Mix lime and sulfur with dry soil before mixing fertilizer.
      b. Mix fertilizer with planting soil no more than seven days before planting.

2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place.

E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 PLACING MANUFACTURED PLANTING SOIL OVER EXPOSED SUBGRADE

A. General: Apply manufactured soil on-site in its final, blended condition. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Subgrade Preparation: Till subgrade to a minimum depth of 6 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

C. Application: Spread planting soil to total depth of 12 inches, but not less than required to meet finish grades after natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.

1. Lifts: Apply planting soil in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

D. Compaction: Compact each lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698.

E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform the following tests and inspections:

1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 2000 sq. ft. of in-place soil or part thereof.

C. Soil will be considered defective if it does not pass tests and inspections.

D. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.6 PROTECTION

A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."

B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Vehicle traffic.
4. Foot traffic.
5. Erection of sheds or structures.
6. Impoundment of water.
7. Excavation or other digging unless otherwise indicated.

8. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION 32 91 13

SECTION 32 92 00

TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Lawn Seeding.
2. Lawn Sodding.

B. Related Requirements:

1. Section 32 91 13 “Soil Preparation”
2. Section 32 93 00 “Plants and Planting”

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 32 91 13 "Soil Preparation".

C. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 INFORMATIONAL SUBMITTALS

A. Certification of grass seed: From seed vendor for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

B. Certification of each seed mixture for turfgrass sod.

C. Product certificates: For fertilizers, from manufacturer.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required maintenance periods.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf establishment.

1. Experience: Five years' experience in turf installation in addition to requirements in Section 01 40 00 "Quality Requirements."
2. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.

C. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

1.9 FIELD CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.
1. Seeded lawns:
   a. Spring Planting: March 1 – May 30
   b. Fall Planting: September 1 – October 15
2. Sodded lawns: May be planted unless the ground is frozen or temperatures will exceed 90 degrees F.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.10 ACCEPTANCE AND WARRANTY

A. An inspection of work completed shall be conducted by the Landscape Architect and Owner's Representative for the purpose of initial acceptance. Any outstanding items revealed on inspection and identified on the punch list shall be corrected with two weeks. Initial acceptance shall be withheld until those items are completed. Acceptance can be on partially completed work. Warranty, for a period of one year, shall begin after landscape inspection and initial acceptance.

B. Warrant in writing that all lawns, placed on this Project will remain alive and be in healthy vigorous condition for a period of 1 year after completion and initial acceptance of entire project.

C. During the warranty period replace, in accordance with the drawings and specifications, all lawns that are in an unhealthy or unsightly condition, or more than 25% dead.

D. Final Inspection and Acceptance: An inspection will be conducted with the Landscape Contractor, Landscape Architect and Owner at the end of the one year warranty period for purposes of Final Acceptance.

E. Warranty shall not include damage or loss of plants due to vandalism, fire, severe winds, extreme cold, or negligence on the Owner's part.

F. Owner's maintenance shall begin upon initial acceptance of plant material.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.

B. Grass-Seed Mix: Proprietary seed mix as follows:

1. Products: Subject to compliance with requirements, provide the following
   a. Full Sun and Part Shade: Newsom Trio Mix, or approved equal.
   b. Full Shade: Newsom Shade Mix or approved equal

2.2 TURFGRASS SOD

A. Turfgrass Sod: Certified, Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.
   1. 90 – 95% Tall Fescue and 5 – 10% maximum Kentucky Bluegrass

B. Turfgrass Species:
   1. Products: Subject to compliance with requirements, provide the following
   2. Sod of grass species as follows:
      a. Full Sun and Part Shade: Newsom Trio Mix, or approved equal.
      b. Full Shade: Newsom Shade Mix or approved equal

2.3 FERTILIZERS

A. General: Apply fertilizer only per soil test report recommendations and Section 32 91 13 Soil Prepation

2.4 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings.

2.5 PESTICIDES/ HERBICIDES

A. General: Use only organic pesticides and herbicides. Do not use glyphosphate. Do not use inorganic pesticides.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
3. Uniformly moisten excessively dry soil that is not workable or which is dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

A. General: After finish grading of subgrade, loosen surface by tilling or raking.

B. Mix planting soil according to Section 32 91 13 "Soil Preparation."

C. Placing Planting Soil: Place and mix planting soil in place over exposed subgrade OR place manufactured planting soil over exposed subgrade.

D. Reduce elevation of planting soil to allow for soil thickness of sod.

E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.

1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
2. Do not use wet seed or seed that is moldy or otherwise damaged.
3. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate of 3 to 4 lb/1000 sq. ft.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes exceeding 1:3with erosion-control blankets installed and stapled according to manufacturer's written instructions.

E. Protect seeded areas with slopes not exceeding 1:3 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

F. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

3.5 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets,

and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.
2. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.6 TURF MAINTENANCE

A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply organic treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings.

3.7 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Architect:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

3.8 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

D. Remove nondegradable erosion-control measures after grass establishment period.

3.9 MAINTENANCE SERVICE

A. Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Turf Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable turf is established, but for not less than the following periods:

1. Seeded Turf: 60 days from date of planting completion or until project completion and initial acceptance, whichever is longer.

    a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

2. Sodded Turf: 30 days from date of planting completion or until project completion and initial acceptance, whichever is longer.

END OF SECTION 32 92 00

SECTION 32 93 00

PLANTS AND PLANTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:
   1. Deciduous tree, shrub and perennial planting
   2. Maintenance

B. Related sections include:
   1. Section 32 91 13 “Soil Preparation” for soil testing and preparation of planting soils

1.3 SUBMITTALS

A. Submit a list of all nurseries that will supply plants.

B. Qualification Data: For qualified landscape Installer.

C. Soil Samples and Soil Test Reports: See 32 91 13 “Soil Preparation”

D. Plant Photographs: Submit color photographs of representative specimens of each type of tree on the plant list. Photos shall be 3”x5” taken from an angle that depicts the size and condition of the typical plant to be furnished. A scale rod or other measuring device shall be included in the photograph. Label each photograph with the plant name, size and name of growing nursery.

E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of exterior plants during a calendar year. Submit before expiration of required maintenance periods.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall have not less than 5 years documented successful experience in meadow installations and be a member of the Landscape Contractors Association. Installer shall submit evidence of qualifications including photographs, locations and references of owners for review by the Landscape Architect and the Owners Representative.

   1. Plant material observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size and quality. Landscape Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
   2. Notify Landscape Architect two weeks in advance of plant observation / tagging schedule.

3. Notify Landscape Architect of sources of planting materials seven days in advance of delivery to site.

B. The contractor shall maintain continuously a competent supervisor, satisfactory to the Owner's Representative, with authority to act in all matter pertaining to this work.

C. Conference: Before any work is started a conference shall be held between the Contractor, the Owner's Representative and the Landscape Architect concerning the work under this contract.

D. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."

E. It is the Landscape Contractor's responsibility to coordinate and cooperate with the other Contractors to enable work to proceed rapidly and efficiently. Coordinate with all adjacent Contractors' work including all paving, lawn, electrical, etc.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver exterior plants freshly dug.

B. Do not prune trees and shrubs before delivery except as approved by Landscape Architect. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of exterior plants during delivery.

C. Deliver exterior plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior plants and trees in shade, protect from weather and mechanical damage, and keep roots moist. Plants shall not be stored on site longer than 1 week.

1.6 PROJECT CONDITIONS

A. Plant material should be installed within the following dates: March 1 – June 1 or September 1 – November 15, or as approved by the Landscape Architect. Plant material may not be dug after May 15.
   1. If the plants are installed outside of the designated planting season, the contractor is responsible for providing an additional 9 month warranty.

B. Weather limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.7 MAINTENANCE SERVICE

A. Initial Planting Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until completion of site construction and initial acceptance.

B. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1.8 ACCEPTANCE AND WARRANTY

A. An inspection of work completed shall be conducted by the Landscape Architect and Owner's Representative for the purpose of initial acceptance. Any outstanding items revealed on inspection and identified on the punch list shall be corrected with two weeks. Initial acceptance shall be withheld until those items are completed. Acceptance can be on partially completed work. Warranty, for a period of one year, shall begin after landscape inspection and initial acceptance.

B. Warrant in writing that all plant material, including groundcovers, placed on this Project will remain alive and be in healthy vigorous condition for a period of 1 year after completion and initial acceptance of entire project.

C. During the warranty period replace, in accordance with the drawings and specifications, all plants that are in an unhealthy or unsightly condition, or more than 25% dead. Warrant all replacement trees for an additional one year period.

D. Final Inspection and Acceptance: An inspection will be conducted with the Landscape Contractor, Landscape Architect and Owner at the end of the one year warranty period for purposes of Final Acceptance.

E. Warranty shall not include damage or loss of plants due to vandalism, fire, severe winds, extreme cold, or negligence on the Owner's part.

F. Owner's maintenance shall begin upon initial acceptance of plant material.

PART 2 - PRODUCTS

2.1 TREE MATERIAL

A. General: Furnish nursery-grown trees complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
   1. Root balls shall comply with ANSI 260.1 standards and shall meet sizes laid out in the ANSI 260.1 standards as well as being intact and undamaged when they arrive on the site. Trees that have deteriorated root balls will not be accepted.

B. If formal arrangements or consecutive order of trees shown, select stock for uniform height and spread, and number label to assure symmetry in planting.

2.2 SHADE TREES

A. Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, complying with ANSI Z60.1 for type of trees required.

   1. Provide balled and burlapped trees.
   2. All trees shall have their north side marked in the nursery prior to digging. Set trees in the hole with the marker facing north.

2.3 TOPSOIL AND PLANT MIX: See Section 32 91 13 Soil Preparation

2.4 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight. Organic matter to be “Leaf Gro Compost” or approved equal.

2.5 FERTILIZER

A. All fertilizers shall be uniform in composition, free flowing and suitable for application with approved equipment. Applications shall be determined by soil test recommendations.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.

C. Slow-Release Fertilizer: Granular or pellet fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium.

D. Planting tablets: Tightly compressed chip type, long lasting, slow release, commercial grade planting fertilizer in tablet form.

2.6 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of shredded hardwood. Natural color only.

2.7 STAKES AND GUYS

A. Upright and Guy Stakes: Rough-sawn, sound, new hardwood or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch by length indicated, pointed at one end.

B. Guys and Tie Wires: No. 12 gauge galvanized wire.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, and lawns and existing exterior plants from damage caused by planting operations.

B. Lay out plants at locations directed by Landscape Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.2 TREE PIT EXCAVATION

A. Tree Pits: Excavate circular pits with sides sloped inward, as shown on the Drawings. Trim base leaving center area raised slightly to support root ball and assist in drainage. Do not further disturb base. Scarify sides of plant pit smeared or smoothed during excavation.
   1. Excavate approximately three times as wide as ball diameter.
   2. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.

3. Do not excavate subgrades of adjacent paving, structures, hardscapes or other new or existing improvements.

B. Subsoil and topsoil from excavations may be used as a component of the planting soil upon approval of the Landscape Architect.

C. Notify Landscape Architect if unexpected rock, obstructions or impermeable soils detrimental to trees or shrubs are encountered in excavations. Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

3.3 TREE PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements. Do not use planting stock if root ball is cracked or broken before or during planting operation.

B. Set plants to the elevations shown on the drawings. Place a maximum 2” soil on top of root ball. Set trees on compacted pads as shown. Use plant mix specified to backfill pit approximately 2/3 full. Water thoroughly before installing remainder of the plant mix to top of pit, eliminating all air pockets. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.

C. Place planting tablets in each tree planting pit when pit is approximately one half filled, in amounts recommended in soils reports from soil testing laboratory. Place tablets beside the root ball about one inch from root tips.

D. Cut ropes and strings from top of tree root balls after plant has been set. Remove burlap or cloth wrapping from around top half of balls, do not remove from under root balls. Do not turn under and bury any portion of burlap.

E. Smooth planting areas to conform to the grades indicated after full settlement has occurred and mulch has been applied. Thoroughly water plants after mulching.

3.4 TREE PRUNING

A. Prune, thin, and shape trees as only as directed by Landscape Architect.

3.5 SHRUB PLANTING

A. Preparation of planting beds: Excavate entire planting bed to specified depths as shown on Drawings. Till subsurface to a depth of 6 inches. Place planting soil in 8” lifts to specified depths, allowing for settlement. Compact lightly after placement of each lift.

B. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in shrub planting beds.

C. Mulch entire planting bed with mulch. Thoroughly water plants after mulching.

3.6 GUYING AND STAKING

A. Stake trees as shown on drawings.

3.7 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect exterior plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

3.8 MAINTENANCE

A. Contractor is responsible for the following maintenance period by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings.

1. Maintenance Period: Until completion of site construction and initial acceptance of all plant material.

B. Maintenance between initial acceptance and final acceptance shall be the responsibility of the Owner.

END OF SECTION 32 92 01

FROEHLING & ROBERTSON, INC.

Report of Geotechnical Study

Parker Gray Stadium Improvements
Alexandria, VA
F&R Project No. 72U0127

Prepared For:

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2000 Duke Street, Suite 120
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Prepared By:
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October 20, 2016

SINCE 1881

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October 20, 2016

Mr. Paul R. Lund, AIA
Principal
hord|coplan|macht
2000 Duke Street, Suite 120
Alexandria, Virginia 22314

Subject: **Report of Subsurface Geotechnical Study**
Parker Gray Stadium Improvements
Alexandria, VA
F&R Project No. 72U0127

Dear Mr. Lund:

The purpose of this study is to present the results of the subsurface exploration program and geotechnical engineering evaluation undertaken by Froehling & Robertson, Inc. (F&R) in connection with the Parker Gray Stadium improvements in Alexandria, Virginia. Our services were performed in general accordance with F&R Proposal No. 1672-00341 dated April 20, 2016, as authorized by your office. The attached report presents our understanding of the project, reviews our exploration procedures, describes existing site and general subsurface conditions, and presents our geotechnical evaluations and recommendations.

We have enjoyed working with you on this project, and we are prepared to assist you with the recommended quality assurance monitoring and testing services during construction. Please contact us if you have any questions regarding this report or if we may be of further service.

Sincerely,
FROEHLING & ROBERTSON, INC.

Parham Safarian Bahri
Staff Engineer

Oscar R. Merida Jr., P.E.
Senior Geotechnical Engineer

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GBA Document "Important Information about Your Geotechnical Engineering Report"

EXECUTIVE SUMMARY

This Executive Summary is provided as a brief overview of our geotechnical engineering evaluation for the project and is not intended to replace more detailed information contained elsewhere in this report. As an overview, this summary inherently omits details that could be very important to the proper application of the provided geotechnical design recommendations. This report should be read in its entirety prior to implementation into design and construction.

- The proposed construction consists of the design and renovation of the Parker Gray Stadium at T.C. William High School located at 3330 King Street in Alexandria, Virginia. The proposed improvements will consist of renovation and expansion of concession stands, restrooms, press box, and ticket booth.
- A subsurface exploration consisting of a total of 6 test borings and 2 infiltration wells were conducted on the site to evaluate the subsurface characteristics of the soil. The test borings were drilled to depths ranging from approximately 10.0 to 30.0 feet. Field infiltration testing was conducted in offset test probes at a depth of 7 feet for borings I-1 and I-2.
- The subsurface soil profile encountered consists of fill materials overlying coastal plain deposits.
- We recommend that a shallow foundation system be used for support of the proposed press box, ticket booth, concession stand, and restroom buildings. Shallow foundations may be designed for a net allowable bearing pressure of 3,000 psf bearing on virgin soils or newly placed structural fill.
- The onsite soils at the locations and elevations tested exhibited approximate infiltration rates ranging from 0.01 to 0.09 inches per hour.
- All foundation subgrades should be evaluated by the geotechnical engineer at the time of construction.

1.0 PURPOSE & SCOPE OF SERVICES

The purpose of the subsurface exploration and geotechnical engineering evaluation was to explore the subsurface conditions for infiltration practices and allowable bearing pressure for the proposed press box, ticket boot, concession stand, and restroom buildings. Based on the subsurface exploration, we have provided geotechnical engineering design and construction recommendations that can be used during the design and construction of these BMP facilities and structures.

F&R's scope of services included the following:

- Completion of 6 Standard Penetration Test (SPT) borings drilled to depths ranging from approximately 10.0 to 30.0 feet below the existing ground surface;
- Completion of 2 field infiltration tests;
- Preparation of typed boring logs;
- Performing geotechnical laboratory testing on representative soil samples;
- Performing a geotechnical engineering evaluation of the subsurface conditions with regard to their suitability for the proposed construction;
- Preparation of this geotechnical report by geotechnical engineers.

Our scope of services did not include plan review and specifications, slope stability evaluation, the identification and evaluation of wetland, or other environmental aspects of the project site.

2.0 PROJECT INFORMATION

2.1 Site Description

The project consists of the renovation of the Parker Gray Stadium at T.C. William High School located at 3330 King Street in Alexandria, Virginia, as shown on the Site Location Plan (Drawing No. 1, Appendix I). The site is adjacent to a natural grass football field surrounded by a concrete sidewalk to the northeast and southwest and the school building on the northeast side. The football infield, including the existing press box, are located at the northeast and southwest of the site.

2.2 Proposed Construction

Project information was provided to us through various phone and email correspondences with your office. We understand that new press box, concession stands, ticket booth, press box, and restroom buildings are planned at Parker Gray Stadium. We have assumed that the grading on

site will remain relatively unchanged as part of this renovation. Cut and fills of less than 2 feet are expected on site.

The BMP facilities are planned at the northwestern corner of the site next to the planned concession stand and bathroom buildings. The proposed ticket booth will be located at the northern portion of the site next to the existing bleachers. The newly proposed press box be at the southern side of the football field. The BMP facilities' inverts are proposed at approximate elevations of 188 and 185 feet at the boring locations I-1 and I-2, respectively.

Structural loading information has not been provided for the proposed structures. We have assumed lightly loaded structures with a maximum load of less than 50 kips for use in design. If this structural loading is not consistent with the proposed design loads, we should be notified to reevaluate our recommendations herein.

3.0 EXPLORATION PROCEDURES

3.1 Subsurface Exploration

The subsurface exploration program (consisting of six test borings designated B-1 through B-4, I-1 and I-2) was performed on October 5 and October 6, 2016, at the approximate locations shown on the attached Boring Location Plan (Drawing No. 2, Appendix I). F&R personnel marked the boring locations in the field by estimating distances from existing structures and utilizing a handheld GPS system accurate up to five feet. In consideration of the methods used in their determination, the boring locations and elevation information shown on the attached Boring Location Plan should be considered approximate. Ground surface elevation for the boring logs were estimated to the nearest one foot based on the plan sheet provided by your office.

The test borings were performed in accordance with generally accepted drilling practice using a truck-mounted CME-55 rotary drill rig. Hollow-stem augers were advanced to pre-selected depths, the center plug was removed, and representative soil samples were recovered with a standard split-spoon sampler (1.375 in. ID & 2 in. OD) in general accordance with ASTM D 1586, the Standard Penetration Test. The split-spoon sampler was driven into the soil by freely dropping a weight of 140 pounds from a height of 30 inches. The number of blows required to drive the split-spoon sampler three or four consecutive 6-inch increments is recorded, and the blows of the second and third increments are summed to obtain the Standard Penetration Resistance (N-value). The N-value provides a general indication of in-situ soil conditions and has been correlated with certain engineering properties of soils. Standard Penetration Testing was conducted utilizing an automatic hammer.

Research has shown that the Standard Penetration Resistance (N-value) determined by the automatic hammer is different than the N-value determined by the safety hammer method. Most corrections that are published in the technical literature are based on the N-value determined by the safety hammer method. This is commonly termed N_{60} as the rope and cathead with a safety hammer delivers about 60 percent of the theoretical energy delivered by a 140-pound hammer falling 30 inches. Several researchers have proposed correction factors for the use of hammers other than the safety hammer. The correction is made by the following equation:

$$N_{60} = N_{field} \times C_E$$

where N_{field} is the value recorded in the field, and C_E is the drill rod energy ratio for the hammer used. A correction factor (C_E) of 1.47 was utilized for the automatic hammer used during the drilling of the borings for this site, based on previous energy measurements made for the automatic hammer system. Plotted N-values reported on the boring logs are the actual, field-derived blow counts (N_{field}). Drilling notes on each of the boring logs indicate whether penetration resistances presented on the boring log were determined using automatic hammer or conventional hammer systems. Corrected N_{60} values were used for all analyses.

In some soils it is not always practical or feasible to drive a split-spoon sampler the full three or four consecutive 6-inch increments. Whenever more than 50 blows are required to drive the sampler over a 6-inch increment, the condition is called split-spoon refusal. Split-spoon refusal conditions may occur because of obstructions or because the earth materials tested are very dense or very hard. When split-spoon refusal occurs, often little or no sample is recovered. The SPT N-value for split-spoon refusal conditions is typically estimated as greater than 100 blows per foot (bpf). Where the sampler is observed not to penetrate after 50 blows, the penetration resistance is reported as 50/0". Otherwise, the depth of penetration after 50 blows is reported in inches, i.e. 50/5", 50/2", etc.

Subsurface water level readings were taken in each of the borings during drilling and inside the augers immediately upon completion of the drilling process. The boreholes were backfilled with soil cuttings upon completion of drilling.

Upon completion of test borings I-1 and I-2, an offset auger probe was drilled to a depth of 7 feet below the existing ground surface for infiltration testing as described in Section 3.2 below.

Split-spoon soil samples recovered on this project will be stored at F&R's office for a period of sixty days. After sixty days, the samples will be discarded unless prior notification is provided to us in writing.

3.2 Infiltration Testing

Infiltration testing was conducted in two offset auger probes for the borings I-1 and I-2. Infiltration testing for this project was completed utilizing a Johnson Constant-head Borehole Permeameter. After excavating the borehole to the desired testing depth, the water control unit of the Johnson Permeameter was placed inside the borehole to apply a constant head of water to the surrounding soil while the flow rate of water into the soil was measured. The test was stopped once the flow rate had reached a steady state, representing saturated soil conditions. The steady state flow rate was then used to calculate the infiltration rate.

3.3 Laboratory Testing

Representative portions of the split-spoon soil samples and auger cutting samples obtained throughout the exploration program were placed in glass jars and plastic bags, respectively, and transported to our laboratory. In the laboratory, the soil samples were evaluated by a member of our professional staff in general accordance with techniques outlined in the visual-manual identification procedure (ASTM D2488) and the Unified Soil Classification System. The soil descriptions and classifications discussed in this report and shown on the attached boring logs are based on visual observation and should be considered approximate. Copies of the boring logs are provided and classification procedures are further explained in the attached Appendix II.

Laboratory tests were performed on select split-spoon soil samples and bulk soil samples in general accordance with the American Society for Testing and Materials (ASTM) standards. The tests performed were Natural Moisture Content (ASTM D 2216), Atterberg Limits (ASTM D 4318), Mechanical Sieve Analysis with Hydrometer (ASTM D 422), Mechanical Sieve Analysis without Hydrometer (ASTM D 6913), and Standard Proctor (ASTM D 698).

4.0 REGIONAL GEOLOGY & SUBSURFACE CONDITIONS

4.1 Regional Geology

Available geologic references, including *Surface Materials Map of Fairfax County and Vicinity, Virginia*, indicate that the site is underlain by Upland Gravel deposits consisting of pebbles and cobbles of quartz, quartzite, and chert, rounded to subrounded, with interstitial sand, silt, and clay.

The deposits are early Cretaceous in age and are described as light-gray to pinkish and greenish gray quartzo-feldspathic sand, fine to coarse grained, pebbly, poorly sorted, commonly thick-bedded and trough cross-bedded. Sand is interbedded with gray to green, massive to thick-bedded sandy clay and silt, commonly mottled red or reddish-brown. The deposits include lesser amounts of clay-clast conglomerate and thin-bedded to laminated, carbonaceous clay and silt.

4.2 Subsurface Conditions

4.2.1 General

The subsurface conditions discussed in the following paragraphs and those shown on the attached Boring Logs represent an estimate of the subsurface conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. The transitions between different soil strata are usually less distinct than those shown on the boring logs. Although individual soil test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times. Data from the specific soil test borings are shown on the attached Boring Logs in Appendix II.

The general subsurface profile encountered consists fill materials overlying coastal plain soils. These materials are generally discussed in the following paragraphs.

4.2.2 Fill Materials

Fill materials were encountered within the test borings to depths ranging from approximately 2.5 to 5.0 feet. Fill materials encountered in this exploration generally consisted of fat CLAY (CH) with varying degrees of sand, clayey SAND (SC), clayey silty SAND (SC-SM), and clayey GRAVEL (GC). Standard Penetration Test (SPT) N-values ranging from 3 to 14 blows per foot (bpf) were recorded for the soils in this stratum, indicating a soft to stiff consistency for the cohesive soils and a very loose to medium dense to very dense state for the granular materials.

4.2.4 Coastal Plain Materials

Coastal plain deposits formed by the alluvial deposition of sediments, were encountered underlying the fill and possible fill materials within the test borings to termination depths ranging from 10 to 30 feet. This layer was generally described as fat CLAY (CH), clayey SAND (SC), clayey silty SAND (SC-SM), silty SAND (SM), poorly graded SAND with silt (SP-SM), clayey silty GRAVEL (GC-GM), and poorly graded GRAVEL with clay (GP-GC). Standard Penetration Test (SPT) N-values ranging from 9 to 100+ blows per foot (bpf) were recorded for the soils in this stratum indicating a stiff consistency for the cohesive materials and a loose to very dense state for the granular soils.

4.3 Subsurface Water

Surface water was encountered in test boring B-1 at a depth of 7.5 and elevation of 179.5 feet during drilling and at a depth of 22.6 and elevation of 163.5 feet inside the augers upon completion of drilling. We expect the ground water table was below an elevation of 179.5 feet during our field exploration. All other borings were reported as dry upon completion of drilling.

Generally, seasonal and yearly fluctuations of the water table should be expected with variations in precipitation, surface runoff, evaporation, and other similar factors.

Geophysical methods were used to evaluate the soils at the I-1 and I-2 testing locations. The soils examined did not contain Redoximorphic features that would indicate an elevated subsurface water level. Therefore, we expect the groundwater table to be below a depth of 10 feet at these two locations.

4.4 Laboratory Test Results

The results of the laboratory tests are summarized in Table 1 below, and are presented in Appendix III of this report.

Table 1 – Soil Classification Test Summary

Boring No.	Sample Depth (ft)	Water Content (%)	% Retained on No. 4 Sieve	% Finer than No. 200 Sieve	Atterberg Limits			USCS Classification	*Maximum Dry Density (pcf)
					L.L.	P.L.	P.I.		
B-1	2.5	15.8	28.0	40.4	20	16	4	SC-SM	
B-2	1.0	17.2	29.8	29.5	24	16	8	SC	115.5
B-2	7.5	14.2	6.1	42.9	21	16	5	SC-SM	
B-3	13.5	3.8	40.3	8.7	15	14	1	SP-SM	
I-1	6.0	5.6	55.6	12.5	22	17	5	GC-GM	
I-2	6.0	6.2	50.0	15.8	26	18	8	GC	

*Standard Proctor based on ASTM D 698

5.0 GEOTECHNICAL DESIGN RECOMMENDATIONS

5.1 General

The following evaluations and recommendations are based on our observations at the site, interpretation of the field and laboratory data obtained during this exploration, and our experience with similar subsurface conditions and projects. Subsurface conditions in unexplored locations may vary from those encountered. If the structure locations, loadings, or elevations are changed, we should be notified and requested to confirm and, if necessary, reevaluate our recommendations.

5.2 Foundation Recommendations

Boring B-1 was conducted at the location of the proposed ticket booth. Boring B-4 was conducted at the location of the proposed press box. Borings B-2 and B-3 were conducted at the location of the proposed concession stands and restroom buildings. Based on the anticipated structural loads provided in the Proposed Construction section of this report, and the subsurface conditions

encountered in our test borings, we recommend that foundations be designed for a maximum allowable bearing pressure of 3,000 pounds per square foot (psf) for footings bearing on virgin soils or newly placed structural fill.

The existing fill soils are not suitable for support of the proposed foundations. Existing fill soils were encountered in the borings to depths ranging from 2.5 to 5.0 feet. These fill soils should be over excavated and replaced with newly placed structural fill in accordance with section 6.2 of this report. As an alternative to structural fill placement, the foundation can be lowered to bear on suitable virgin soils.

To reduce the possibility of localized shear failures, spread and strip footings should be a minimum of 3.0 feet and 1.5 feet wide, respectively. We recommend that exterior footings be constructed at least 2.5 feet below adjacent grades in order to bear below normal frost depth.

5.3.1 Settlement (Shallow foundations)

Our settlement analyses was performed on assumed structural loading and grading information as discussed in the project information section of this report. Actual settlements experienced by the proposed structures and the time required for these soils to settle will be influenced by undetected variations in subsurface conditions, actual structural loads, final grading plans, and the quality of fill placement and foundation construction.

Based on the boring data and assumed loading information, we estimate total settlements due to the proposed structures of approximately one inch, with differential settlement of half the estimated total settlement. The magnitude of differential settlements will be influenced by the variation in excavation requirements across the proposed structures' footprint, the distribution of loads, and the variability of underlying soils.

5.4 Slab-on Grade

The ground floor slab at the concession stand and the bathroom building may be designed as a slab-on-grade supported by suitable existing fill materials, residual soils, or newly placed controlled structural fill. If the existing fill materials or coastal plain/residual soils are used for support of the ground floor slabs, the subgrade should be observed during construction by the geotechnical engineer to identify soft unsuitable areas. These areas should be undercut and replaced with compacted fill and/or stabilized in-place (see Site Preparation Section).

A vapor retarder should be used beneath ground floor slabs that will be covered by tile, wood, carpet, impermeable floor coatings, and/or if other moisture-sensitive equipment or materials will be in contact with the floor. However, the use of vapor retarders may result in excessive

curling of floor slabs during curing. We refer the floor slab designer to ACI 302.1R-96, Sections 4.1.5 and 11.11, for further discussion on vapor retarders, curling, and the means to minimize concrete shrinkage and curling.

We recommend that ground floor slabs have a minimum thickness of 4 inches and be reinforced with welded wire fabric. A granular drainage blanket, consisting of 4 inches of crushed or washed gravel should be placed beneath the ground floor slab for lateral drainage and to act as a capillary barrier.

Proper jointing of the ground floor slab is also essential to minimize cracking. ACI suggests that unreinforced, plain concrete slabs may be jointed at spacings of 24 to 36 times the slab thickness, up to a maximum spacing of 18 feet. Floor slab construction should incorporate isolation joints along bearing walls and around column locations to allow minor movements to occur without damage. We also recommend that isolation joints be incorporated along the perimeter of the proposed and existing slab-on-grade to reduce the risk of future settlement. Utility or other construction excavations in the prepared floor subgrade should be backfilled with controlled fill placed in accordance with the recommendations of this report to provide uniform floor support.

5.5 Seismic Class Definition

The following Seismic Site Class Definition was established in general accordance with Table 20.3-1 of the ASCE 7-10 as set forth in the International Building Code (IBC) 2015. Our scope of services did not include a seismic conditions survey to determine site-specific shear wave velocity information, however, ASCE 7-10, Chapter 20 provides a methodology for interpretation of Standard Penetration Test resistance values (N-values) to determine a Site Class Definition. Based on the SPT soil testing, we recommend that a Seismic Site Class "D" be used in accordance with ASCE 7-10 for the proposed building.

5.6 Infiltration Facilities

The Virginia Department of Environmental Quality Stormwater Design Specification No. 8 requires that infiltration facilities have a subsoil profile with a minimum field infiltration rate of 0.5 inches/hour. Additionally, a minimum buffer of 2 feet is required between the bottom of an infiltration facility and the existing groundwater table or bedrock. Results of the field testing and laboratory correlations with USDA soil texture are summarized in Table 2 below:

Table 2. Infiltration Testing and Laboratory Correlation Results

Test Location	Infiltration Rate based on field test (in./hr.)	*USDA % Clay Content	*USDA % Silt Content	USDA Classification
I-1	0.09	5.7	18.4	Sandy Clay Loam
I-2	0.01	5.2	21.9	Sandy Loam

*% Silt and clay are based upon USDA soil classification

Based on the guidelines provided above, neither of the locations tested are considered suitable for design utilizing in-situ infiltration.

6.0 GEOTECHNICAL CONSTRUCTION RECOMMENDATIONS

6.1 Site Preparation

Before proceeding with construction, any surficial soils and other deleterious non-soil materials should be stripped or removed from the proposed construction area. During the clearing and stripping operations, positive surface drainage should be maintained to prevent the accumulation of water. Underground utilities should be re-routed to locations a minimum of 10 feet outside of the proposed building areas.

After stripping, areas intended to support new fill and structures should be carefully evaluated by a geotechnical engineer. At that time, the engineer may require proofrolling of the subgrade with a 20- to 30-ton loaded truck or other pneumatic-tired vehicle of similar size and weight. Proofrolling should be performed during a time of good weather and not while the site is wet, frozen, or severely desiccated. The purpose of the proofrolling is to locate soft, weak, or excessively wet soils present at the time of construction. Any unsuitable materials observed during the evaluation and proofrolling operations should be undercut and replaced with compacted fill and/or stabilized in-place.

The proofrolling process provides a good opportunity to identify areas of poorer support materials intermediate of the test boring locations, if present. If encountered, low-consistency materials may require undercutting and/or in-place stabilization. The possible need for, and extent of, undercutting and/or in-place stabilization required can best be determined by the geotechnical engineer at the time of construction. Once the site has been properly prepared, at grade construction may proceed.

6.2 Structural Fill Placement and Compaction

If required during construction, controlled fill may be constructed using the non-organic on-site soils or an off-site borrow source having a classification of GM, GP, SW, SP, SM, SC, and ML as defined by the Unified Soil Classification System. Fill materials soils should have a maximum liquid limit of 45 and plasticity less than 20. Other materials may be suitable for use as controlled structural fill material and should be individually evaluated by the geotechnical engineer. Controlled fill should be free of boulders, organic matter, debris, or other deleterious materials and should have a maximum particle size no greater than 3 inches. In addition, we recommend a minimum standard Proctor (ASTM D 698) maximum dry density of approximately 100 pounds per cubic feet for fill materials. A mixture of on-site soils and boulders/cobbles is not an acceptable fill material.

Fill materials should be placed in horizontal lifts with a maximum height of 8 inches loose measure. New fill should be adequately keyed into stripped and scarified subgrade soils and should, where applicable, be benched into the existing slopes. During fill operations, positive surface drainage should be maintained to prevent the accumulation of water. We recommend that structural fill be compacted to at least 95 percent of the standard Proctor maximum dry density. In confined areas such as utility trenches, portable compaction equipment and thin lifts of 3 to 4 inches may be required to achieve specified degrees of compaction.

In general, we recommend that the moisture content of fill soils be maintained within three percentage points of the optimum moisture content as determined from the standard Proctor density test. Excessively wet or excessively dry soils should not be used as fill material without proper drying or wetting. We recommend that the contractor have equipment on site during earthwork for both drying and wetting of fill soils. Each lift of fill should be tested in order to confirm that the recommended degree of compaction is attained.

6.3 Foundation Construction

All foundation subgrades should be observed, evaluated, and verified for the design bearing pressure by the geotechnical engineer after excavation and prior to reinforcement steel placement. If low consistency soils are encountered during foundation construction, localized undercutting and/or in-place stabilization of foundation subgrades will be required. Existing fill materials encountered to depths ranging from 2.5 to 5.0 feet at the boring locations are not suitable for support of the proposed foundations. These fill materials should be undercut to suitable virgin soils. The actual need for and extent of undercutting should be based on field observations made by the geotechnical engineer at the time of construction.

Excavations for footings should be made in such a way as to provide bearing surfaces that are firm and free of loose, soft, wet, or otherwise disturbed soils. Foundation concrete should not be placed on frozen or saturated subgrades. If such materials are allowed to remain below foundations, settlements will increase. Foundation excavations should be concreted as soon as practical after they are excavated. If an excavation is left open for an extended period, a thin mat of lean concrete should be placed over the bottom to minimize damage to the bearing surface from weather or construction activities. Water should not be allowed to pond in any excavation.

6.4 Surface Water/Groundwater Control

Subsurface water for the purposes of this report is defined as water encountered below the existing ground surface. Subsurface water was encountered on site during the drilling of Boring B-1 at a depth of 18.5 feet during drilling and at 22.6 feet inside the augers upon completion of drilling. The contractor should be prepared to dewater should groundwater be encountered during construction. Fluctuations in subsurface water levels and soil moisture can be anticipated with changes in precipitation, runoff, and season.

6.5 Temporary Excavation Recommendations

Mass excavations and other excavations required for construction of this project must be performed in accordance with the United States Department of Labor, Occupational Safety and Health Administration (OSHA) guidelines (29 CFR 1926, Subpart P, Excavations) or other applicable jurisdictional codes for permissible temporary side-slope ratios and/or shoring requirements. The OSHA guidelines require daily inspections of excavations, adjacent areas and protective systems by a "competent person" for evidence of situations that could result in cave-ins, indications of failure of a protective system, or other hazardous conditions. All excavated soils, equipment, building supplies, etc., should be placed away from the edges of the excavation at a distance equaling or exceeding the depth of the excavation. F&R cautions that the actual excavation slopes will need to be evaluated frequently each day by the "competent person" and flatter slopes or the use of shoring may be required to maintain a safe excavation depending upon excavation specific circumstances. The contractor is responsible for providing the "competent person" and all aspects of site excavation safety. F&R can evaluate specific excavation slope situations if we are informed and requested by the owner, designer or contractor's "competent person".

7.0 CONTINUATION OF SERVICES

We recommend that we be given the opportunity to review the foundation plan, grading plan, and project specifications when construction documents approach completion. This review evaluates

whether the recommendations and comments provided herein have been understood and properly implemented. We also recommend that Froehling & Robertson, Inc. be retained for professional and construction materials testing services during construction of the project. Our continued involvement on the project helps provide continuity for proper implementation of the recommendations discussed herein.

The Geotechnical Engineer of Record should be retained to monitor and test earthwork activities, and subgrade preparations for foundations and excavations. It should be noted that the actual soil conditions at the various subgrade levels and footing bearing grades will vary across this site and thus the presence of the Geotechnical Engineer and/or his representative during construction will serve to validate the subsurface conditions and recommendations presented in this report. We recommend that F&R be employed to monitor the earthwork, foundation, and construction, and to report that the recommendations contained in this report are completed in a satisfactory manner. Our involvement on the project will aid in the proper implementation of the recommendations discussed herein. The following is a recommended scope of services:

- Review of project plans and construction specifications to verify that the recommendations presented in this report have been properly interpreted and implemented;
- Observe and perform testing during earthwork to document that subsurface conditions encountered during construction are consistent with those anticipated in this report;
- Observe subgrade preparation including any proofrolling operations, undercutting of soft/loose unsuitable soils, installation of drainage materials, geotextiles and fill placement;
- Observe all foundation excavations and footing bearing grades for compliance with the geotechnical recommendations.

8.0 LIMITATIONS

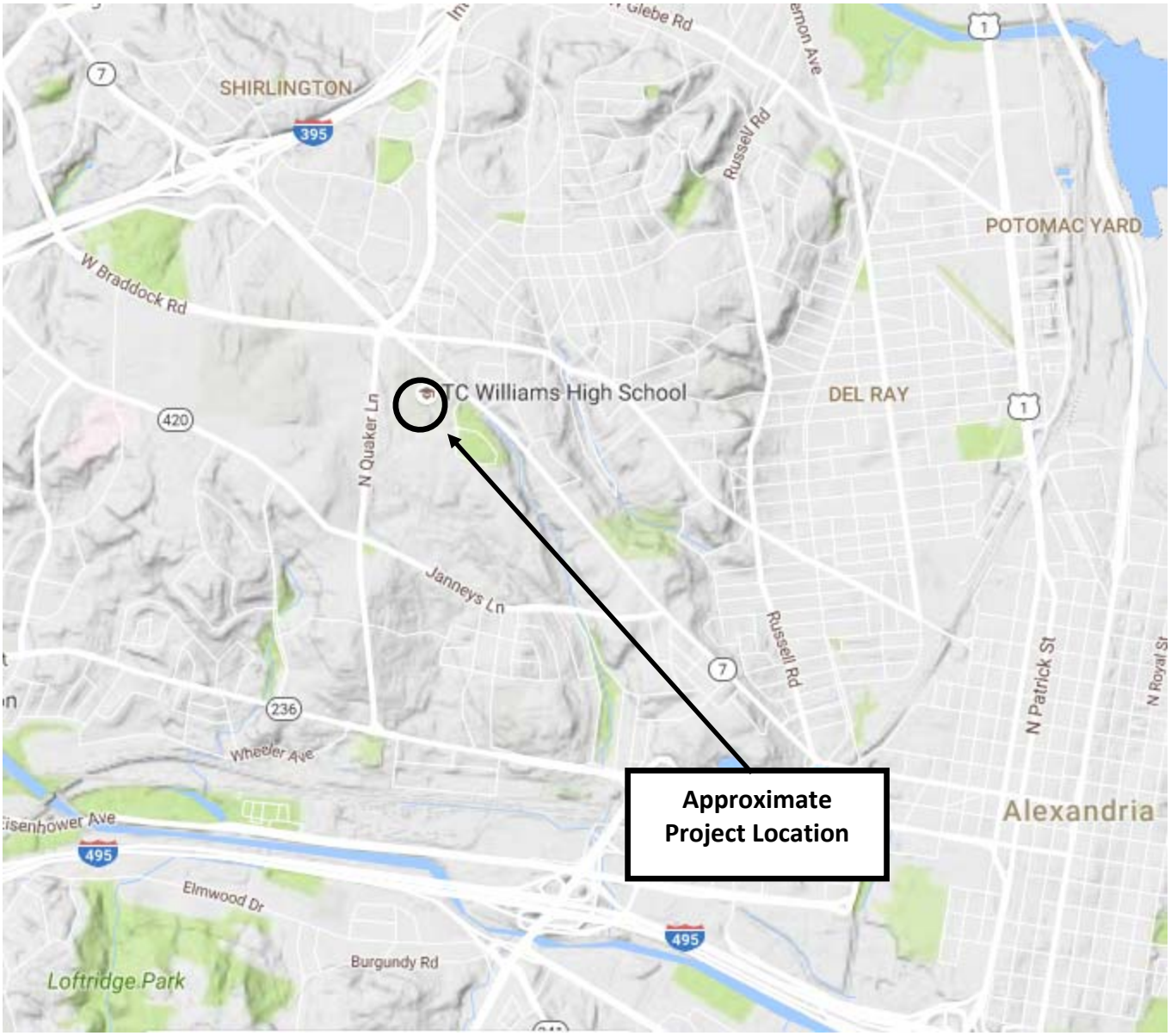
This report has been prepared for the exclusive use of hord|coplan|macht, Inc. or their agent, for specific application to the Parker Gray Stadium Improvements located in Alexandria, Virginia, in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. Our evaluations and recommendations are based on design information furnished to us; the data obtained from the previously described subsurface exploration program, and generally accepted geotechnical engineering practice. The evaluations and recommendations do not reflect variations in subsurface conditions which could exist intermediate of the boring locations or in unexplored areas of the site. Should such variations become apparent during construction, it will be necessary to re-evaluate our recommendations based upon on-site observations of the conditions.

There are important limitations to this and all geotechnical studies. Some of these limitations are discussed in the information prepared by GBA, which is included in Appendix IV. We ask that you please review this GBA information.

Regardless of the thoroughness of a subsurface exploration, there is the possibility that conditions between borings will differ from those at the boring locations, that conditions are not as anticipated by the designers, or that the construction process has altered the soil conditions. Therefore, experienced geotechnical engineers should evaluate earthwork construction to verify that the conditions anticipated in design actually exist. Otherwise, we assume no responsibility for construction compliance with the design concepts, specifications, or recommendations.

In the event that changes are made in the design or location of the proposed infiltration facilities, the recommendations presented in the report shall not be considered valid unless the changes are reviewed by our firm and conclusions of this report modified and/or verified in writing. If this report is copied or transmitted to a third party, it must be copied or transmitted in its entirety, including text, attachments, and enclosures. Interpretations based on only a part of this report may not be valid.

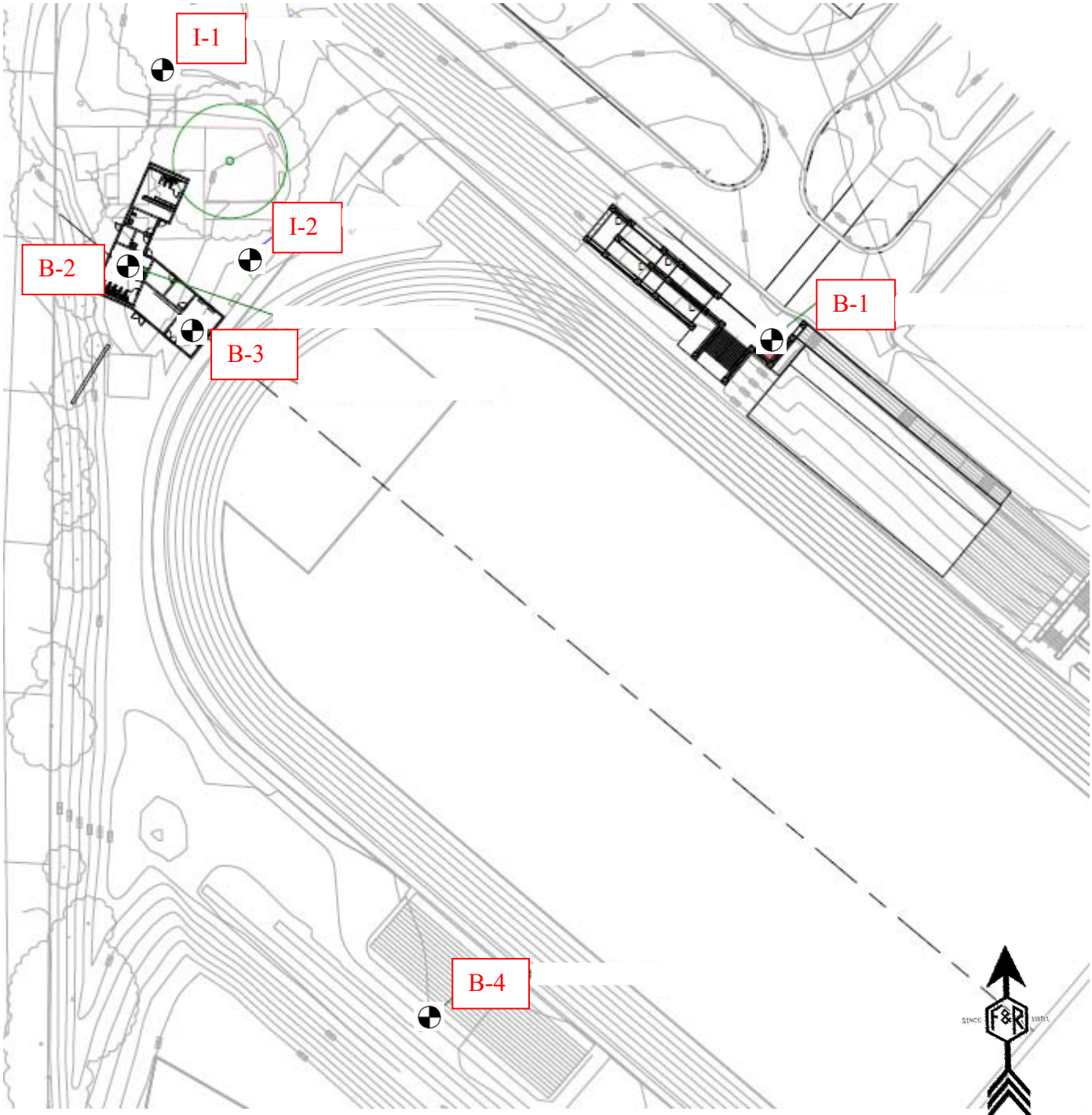
APPENDIX I



FROEHLING & ROBERTSON, INC. *Engineering Stability Since 1881*	DATE: October 2016
	SOURCE: Google Maps
	DRAWN: PSB / F&R # 72U0127

Site Location Map
hord|coplan|macht, Inc.
Parker Gray Stadium Improvements
Alexandria, Virginia

Drawing No.
1



Drawing provided by hord|coplan|macht, Inc.

Legend

- Approximate Boring Location

FROEHLING & ROBERTSON, INC.

Engineering Stability Since 1881

DATE: October 2016

SCALE: N/A | Source: Google Maps

DRAWN: PSB | F&R # 72U0127

Boring Location Plan

hord|coplan|macht, Inc.

Parker Gray Stadium Improvements

Alexandria, Virginia

Drawing No.

2

APPENDIX II

KEY TO SOIL CLASSIFICATION

Correlation of Penetration Resistance with Relative Density and Consistency

Sands and Gravels		Silts and Clays	
No. of Blows, N	Relative Density	No. of Blows, N	Consistency
0 - 4	Very loose	0 - 2	Very soft
5 - 10	Loose	3 - 4	Soft
11 - 30	Medium dense	5 - 8	Firm
31 - 50	Dense	9 - 15	Stiff
Over 50	Very dense	16 - 30	Very stiff
		31 - 50	Hard
		Over 50	Very hard

Particle Size Identification

(Unified Classification System)

Boulders:	Diameter exceeds 12-in. (300-mm)
Cobbles:	3-in. (75-mm) to 12-in. (300-mm) diameter
Gravel:	**Coarse** - ¾-in. (19-mm) to 3 in. (75-mm) diameter **Fine** - No. 4 (4.75-mm) sieve to ¾-in. (19-mm) diameter
Sand:	**Coarse** – No. 10 (2.0-mm) to No. 4 (4.76 mm) sieve **Medium** – No. 40 (0.425-mm) to No. 10 (2.0-mm) sieve **Fine** - No. 200 (0.075-mm) to No. 40 (0.425-mm) sieve
Silt and Clay:	Less than No. 200 (0.075-mm) sieve

Modifiers

The modifiers provide our estimate of the amount of silt, clay or sand size particles in the soil sample.

Approximate Content	Modifiers
≤ 5%:	Trace
5 to 10%:	Few
15 to 25%:	Little
30 to 45%:	Some
50 to 100%	Mostly

Field Moisture Description	
Dry	Absence of moisture, dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

ASTM Designation: D 2487

(Based on Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	Group Name [B]
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retaining on No. 4 sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]	GW	Well graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]	GP	Poorly graded gravel [F]
		Gravels with Fines More than 12 % fines[C]	Fines classify as ML or MH	GM	Silty gravel [F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel [F,G,H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]	SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]	SP	Poorly graded sand [I]
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand [G,H,I]
			Fines classify as CL or CH	SC	Clayey sand [G,H,I]
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve	Silts and Clays Liquid Limit less than 50	Inorganic	PI > 7 and plots on or above "A" line [J]	CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K,L,M]
		Organic	Liquid limit - oven dried <0.75 Liquid limit - not dried	OL	Organic clay [K,L,M,N]
					Organic silt [K,L,M,O]
	Silts and Clays Liquid Limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay [K,L,M]
			PI plots below "A" line	MH	Elastic silt [K,L,M]
		Organic	Liquid limit - oven dried <0.75 Liquid limit - not dried	OH	Organic clay [K,L,M,P]
					Organic silt [K,L,M,Q]
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-in (75 mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $Cc = (D_{30})^2/(D_{10}*D_{60})$

[F] If soil contains ≥ 15% sand, add "with sand" to the group name

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM

[H] If fines are organic, add "with organic fines" to the group name

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name

[J] If Atterberg limits plot in hatched area, soils is a CL-ML, silty clay

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant

[L] If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name

[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name

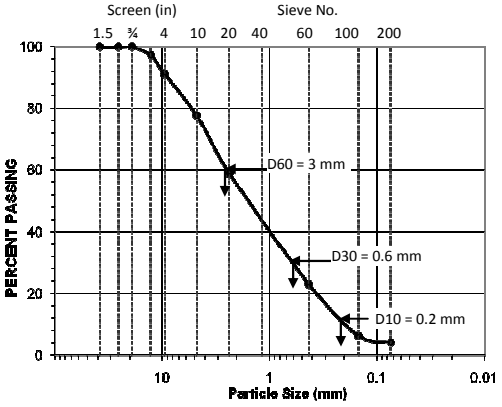
[N] PI ≥ 4 and plots on or above "A" line

[O] PI < 4 or plots below "A" line

[P] PI plots on or above "A" line

[Q] PI plots below "A" line

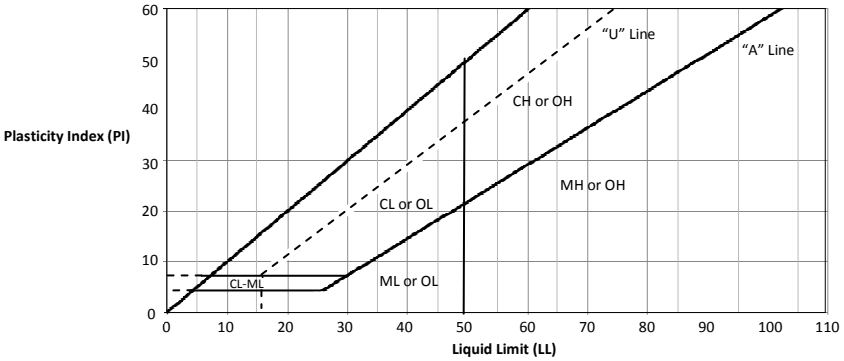
SIEVE ANALYSIS



$Cu = D_{60}/D_{10} = (3/0.2) = 15$

$Cc = (D_{30})^2/(D_{10}*D_{60}) = (0.6^2)/(0.2*3) = 0.6$

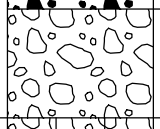
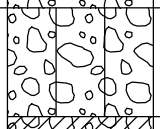
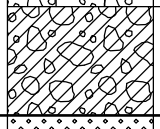
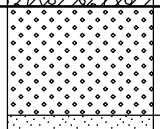
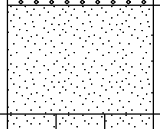
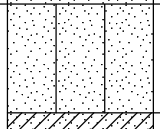
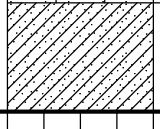
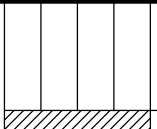
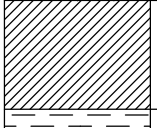
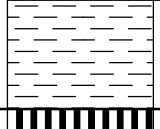
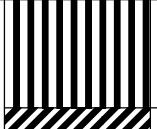
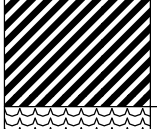
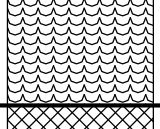
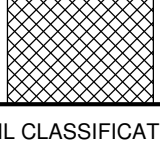
For classification of fine-grained soils and fine-grained fraction of coarse-grained soils:



Equation of "A" line: Horizontal at PI = 4 to LL = 22.5, then PI = 0.73*(LL-20)

Equation of "U" line: Vertical at LL = 16 to PI = 7, then PI = 0.9*(LL-8)

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
EXISTING FILL				FILL	EXISTING FILL MATERIALS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SINCE 1881

Froehling & Robertson, Inc.

Boring LOG

Boring: B-1 (1 of 1)

Project No: 72U-0127
Client: Hord Coplan Macht, Inc
Project: Parker Gray Stadium Improvements
City/State: Alexandria, Virginia

Elevation: 187 ± *
Total Depth: 30.0'
Location: See Boring Location Plan

Drilling Method: 2.25" HSA
Hammer Type: Automatic
Date Drilled: 10/6/16
Driller: Jim Davis

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
		FILL, Brown, fat CLAY (CH), with sand, trace gravel, soft, moist	2-2-2	0.5 2.0	4	
184.5	2.5	Brown, clayey silty SAND (SC-SM), with gravel, very loose, moist	2-1-2	2.5 4.0	3	
182.0	5.0	**COASTAL PLAIN**, tan-brown, poorly graded GRAVEL (GP) with sand, trace clay, dense, wet	6-15-25	5.0 6.5	40	
179.5	7.5	Orange-brown, clayey SAND (SC) with gravel, contains gravel, very dense, moist	39-46-45	7.5 9.0	91	Water level at 7.5 feet during drilling
177.0	10.0	Orange-brown, clayey GRAVEL (GC), contains quartz, very dense, moist	15-23-30	10.0 11.5	53	
			26-27-40	13.5 15.0	67	
168.5	18.5	Orange-brown, silty SAND (SM), trace gravel, contains quartz, medium dense, wet	15-6-6	18.5 20.0	12	
163.5	23.5	Orange-brown and gray, fat CLAY (CH), stiff, moist	3-4-5	23.5 25.0	9	
158.5	28.5	Orange-brown, clayey SAND (SC) with gravel, contains quartz, medium dense, moist	5-7-8	28.5 30.0	15	
157.0	30.0	Boring terminated at 30 feet. Boring was backfilled with soil cuttings upon completion of drilling * Elevations were estimated to the nearest one foot based on the drawing provided by hord|coplan|macht, Inc.				Water level at 22.6 feet upon completion of drilling Cave-in depth at 23.0 feet

BORING_LOG BORING LOGS.GPJ F&R.GDT 10/20/16

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

Froehling & Robertson, Inc.

Boring LOG

Boring: B-2 (1 of 1)

Project No: 72U-0127
Client: Hord Coplan Macht, Inc
Project: Parker Gray Stadium Improvements
City/State: Alexandria, Virginia

Elevation: 192 ± *
Total Depth: 20.0'
Location: See Boring Location Plan

Drilling Method: 2.25" HSA
Hammer Type: Automatic
Date Drilled: 10/6/16
Driller: Jim Davis

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
		FILL, Brown, clayey SAND (SC) with gravel, loose, moist	3-3-3	0.0	6	
				1.5		
189.5	2.5	**COASTAL PLAIN**, Orange-brown and tan, poorly graded GRAVEL (GP) with clay, contains quartz, very dense, moist	14-26-29	2.5	55	
				4.0		
187.0	5.0	Orange-brown, poorly graded GRAVEL with clay (GP-GC), dense, moist	17-23-25	5.0	48	
				6.5		
184.5	7.5	Orange-brown, clayey silty SAND (SC-SM), little gravel, contains quartz, medium dense, moist	5-7-20	7.5	27	
				9.0		
182.0	10.0	Orange-brown, poorly graded GRAVEL (GP), trace clay, contains quartz, very dense, moist	50/5	10.0	100+	
178.5	13.5	Orange-brown, clayey GRAVEL (GC), contains quartz, very dense to dense, moist	30-42-48	13.5	90	
				15.0		
			16-18-21	18.5	39	
172.0	20.0	Boring terminated at 20 feet. Boring was backfilled with soil cuttings upon completion of drilling		20.0		Boring dry upon completion of drilling Cave-in depth at 16 feet
		* Elevations were estimated to the nearest one foot based on the drawing provided by hord|coplan|macht, Inc.				

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

SINCE 1881

Froehling & Robertson, Inc.

Boring LOG

Boring: B-3 (1 of 1)

Project No: 72U-0127
Client: Hord Coplan Macht, Inc
Project: Parker Gray Stadium Improvements
City/State: Alexandria, Virginia

Elevation: 193 ± *
Total Depth: 20.0'
Location: See Boring Location Plan

Drilling Method: 2.25" HSA
Hammer Type: Automatic
Date Drilled: 10/6/16
Driller: Jim Davis

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
		COASTAL PLAIN, Orange-brown, clayey GRAVEL (GC), contains quartz, medium dense to very dense, moist	5-5-15	0.5		
				2.0	20	
			12-23-30	2.5		
				4.0	53	
			29-34-40	5.0		
				6.5	74	
			11-38-47	7.5		
				9.0	85	
			33-37-50/5"	10.0		
				11.4	100+	
179.5	13.5	Orange-brown, poorly graded SAND with silt (SP-SM), trace gravel, contains quartz, very dense, moist	17-28-42	13.5		
				15.0	70	
174.5	▽18.5	Brown, clayey GRAVEL (GC), contains quartz, very dense, wet	18-25-29	18.5		
173.0	20.0			20.0	54	
		Boring terminated at 20 feet. Boring was backfilled with soil cuttings upon completion of drilling				Boring dry upon completion of drilling Cave-in depth at 15.8 feet
		* Elevations were estimated to the nearest one foot based on the drawing provided by hord|coplan|macht, Inc.				

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

Froehling & Robertson, Inc.

Boring LOG

Boring: B-4 (1 of 1)

Project No: 72U-0127
Client: Hord Coplan Macht, Inc
Project: Parker Gray Stadium Improvements
City/State: Alexandria, Virginia

Elevation: 193 ± *
Total Depth: 20.0'
Location: See Boring Location Plan

Drilling Method: 2.25" HSA
Hammer Type: Automatic
Date Drilled: 10/6/16
Driller: Jim Davis

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
		FILL, Red-brown, fat CLAY (CH) with sand, trace gravel, stiff, moist	3-5-5	0.0	10	
				1.5		
190.5	2.5	**COASTAL PLAIN**, Orange-brown and tan, clayey SAND (SC) with gravel, trace root matter, dense, moist	6-14-22	2.5	36	
				4.0		
188.0	5.0	Orange-brown, clayey GRAVEL (GC), contains quartz, very dense, moist	50/6"	5.0	100+	
			50/5"	7.5	100+	
183.0	10.0	Orange-brown, clayey SAND (SC) with gravel, dense, moist	17-15-30	10.0	45	
				11.5		
179.5	13.5	Orange-brown, clayey GRAVEL (GC), contains quartz, very dense, moist	20-28-30	13.5	58	
				15.0		
			50/3"	18.5	100+	Boring advanced to 20 feet
173.0	20.0	Boring terminated at 20 feet. Boring was backfilled with soil cuttings upon completion of drilling				Boring dry upon completion of drilling Cave-in depth at 13 feet
		* Elevations were estimated to the nearest one foot based on the drawing provided by hord|coplan|macht, Inc.				

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

SINCE 1881

Froehling & Robertson, Inc.

Boring LOG

Boring: I-1 (1 of 1)

Project No: 72U-0127
Client: Hord Coplan Macht, Inc
Project: Parker Gray Stadium Improvements
City/State: Alexandria, Virginia

Elevation: 193 ± *
Total Depth: 10.0'
Location: See Boring Location Plan

Drilling Method: 2.25" HSA
Hammer Type: Automatic
Date Drilled: 10/6/16
Driller: Jim Davis

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
		Fill, Orange-brown, poorly graded GRAVEL (GP) with clay, contains quartz, medium dense, moist	5-9-10 -10	0.0	19	
191.0	2.0	Black and brown, clayey GRAVEL (GC), medium dense, moist	8-10-10 -15	2.0	20	Infiltration testing was conducted in offset boring I-1A at a depth of 7 feet
189.0	4.0	**COASTAL PLAIN** Orange-brown, clayey GRAVEL (GC), contains quartz, dense, moist	14-15-32 -50/6"	4.0	47	
187.0	6.0	Orange-brown and tan, clayey silty GRAVEL (GC-GM), contains quartz, very dense, moist	42-45-50/6" -50/6"	6.0	100+	
			10-36-50/6"	8.0	100+	Boring advanced to 10 feet.
183.0	10.0	Boring was backfilled with soil cuttings upon completion of drilling		9.5		Boring dry upon completion of drilling Cave-in depth at 8 feet

* Elevations were estimated to the nearest one foot based on the drawing provided by hord|coplan|macht, Inc.

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

Froehling & Robertson, Inc.

Boring LOG

Boring: I-2 (1 of 1)

Project No: 72U-0127
Client: Hord Coplan Macht, Inc
Project: Parker Gray Stadium Improvements
City/State: Alexandria, Virginia

Elevation: 190 ± *
Total Depth: 10.0'
Location: See Boring Location Plan

Drilling Method: 2.25" HSA
Hammer Type: Automatic
Date Drilled: 10/6/16
Driller: Jim Davis

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
		FILL, Brown, clayey GRAVEL (GC), medium dense, moist	6-6-8 -9	0.0	14	
188.0	2.0	**COASTAL PLAIN**, Orange-brown and tan, clayey GRAVEL (GC), contains quartz, dense to very dense, moist	4-11-32 -35	2.0	43	Infiltration testing was conducted in offset boring I-2A at a depth of 7 feet
			16-32-44 -50/6"	4.0	76	
			31-42-46 -50/4"	6.0	88	
			10-33-34 -50/5"	7.8 8.0	67	
180.0	10.0	Boring terminated at 10 feet. Boring was backfilled with soil cuttings upon completion of drilling		9.9		Boring dry upon completion of drilling Cave-in depth at 8 feet
		* Elevations were estimated to the nearest one foot based on the drawing provided by hord|coplan|macht, Inc.				

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

APPENDIX III

Froehling & Robertson, Inc.

LABORATORY TEST SUMMARY SHEET

Project No: 72U-0127

Client: Hord Coplan Macht, Inc

Project: Parker Gray Stadium Improvements

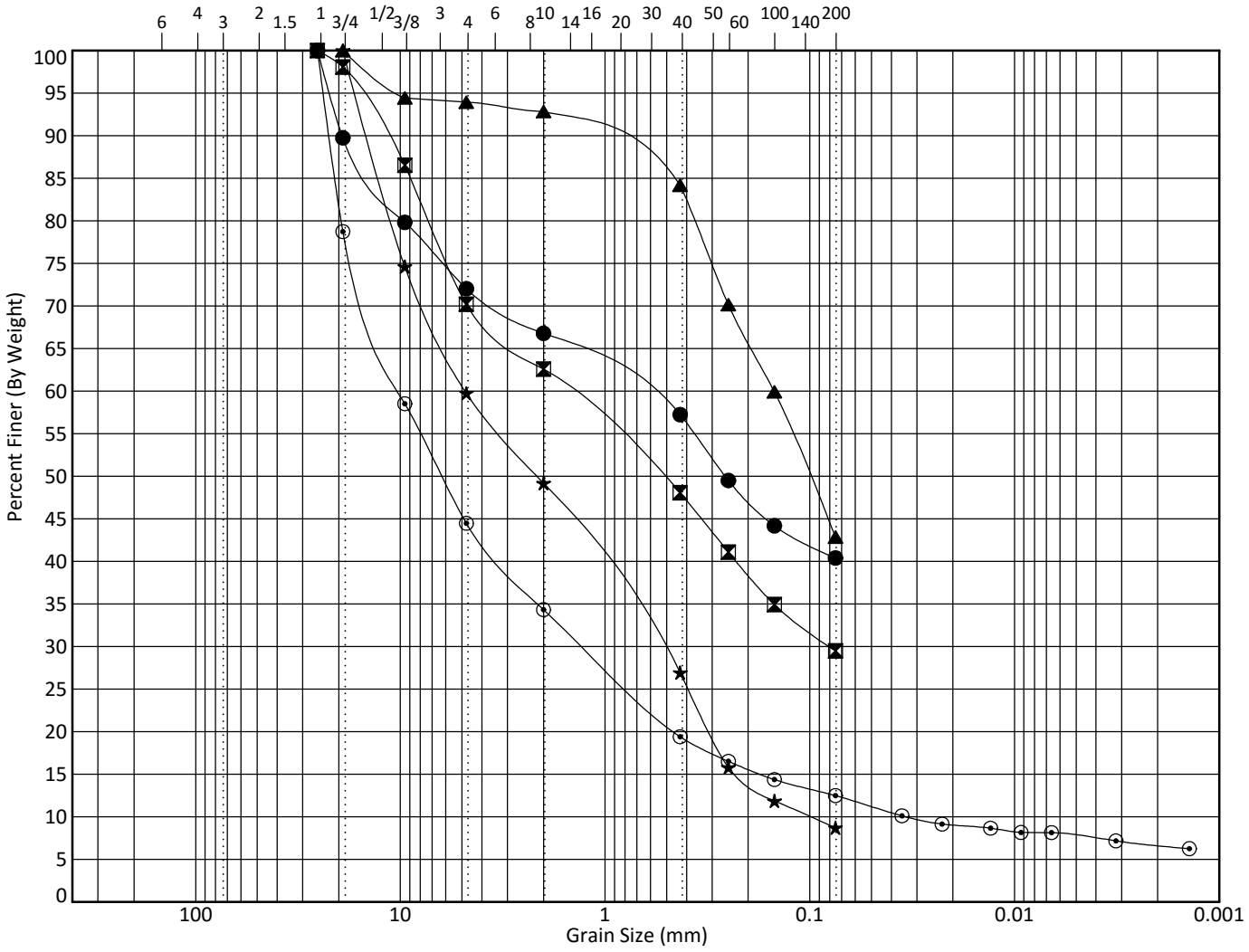
City/State: Alexandria, Virginia

Boring/ Sample No.	Depth (ft)	LL	PL	PI	Water Content (%)	% Gravel	% Sand	% Fines	USCS Class.	AASHTO Class.	Maximum Dry Density (pcf)	Optimum Water Content (%)	CBR Value @ 0.1
B-1	2.5	20	16	4	15.8	28.0	31.6	40.4	SC-SM	A-4			
B-2	1.0	24	16	8	17.2	29.8	40.7	29.5	SC	A-2-4	115.5	12.1	
B-2	7.5	21	16	5	14.2	6.1	51.1	42.9	SC-SM	A-4			
B-3	13.5	15	14	1	3.8	40.3	51.0	8.7	SP-SM	A-1-a			
I-1	6.0	22	17	5	5.6	55.6	32.0	12.5	GC-GM	A-1-a			
I-2	6.0	26	18	8	6.2	50.0	34.2	15.8	GC	A-2-4			

Froehling & Robertson, Inc.

GRAIN SIZE DISTRIBUTION

Project No: 72U-0127
Client: Hord Coplan Macht, Inc
Project: Parker Gray Stadium Improvements
City/State: Alexandria, Virginia



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring No.		Depth	Classification	LL	PL	PI	Cc	Cu
●	B-1	at	2.5	SILTY, CLAYEY SAND with GRAVEL (SC-SM)	20	16	4		
⊠	B-2	at	1.0	CLAYEY SAND with GRAVEL (SC)	24	16	8		
▲	B-2	at	7.5	SILTY, CLAYEY SAND (SC-SM)	21	16	5		
★	B-3	at	13.5	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	15	14	1	0.59	48.54
⊙	I-1	at	6.0	SILTY, CLAYEY GRAVEL with SAND (GC-GM)	22	17	5	4.86	297.35

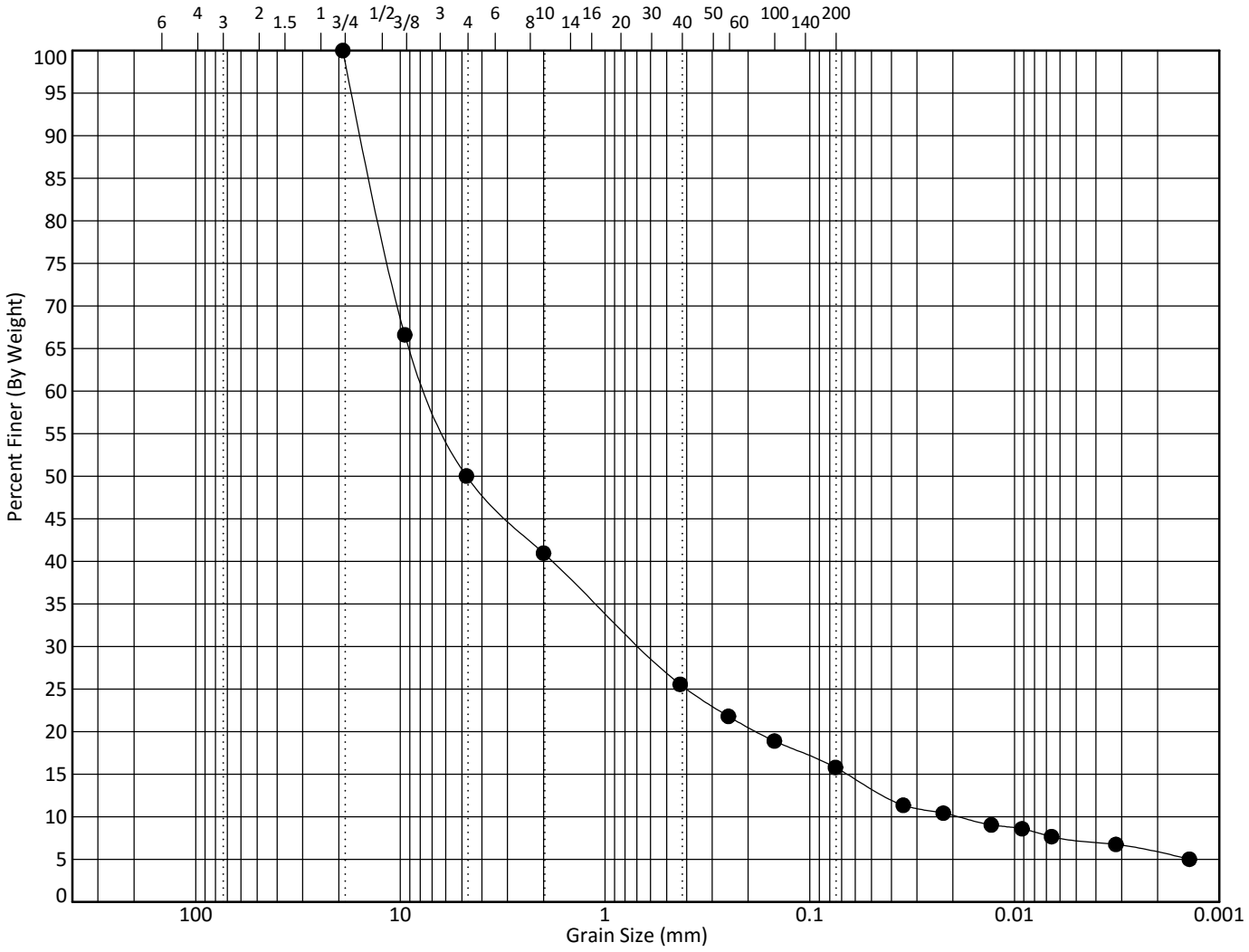
	Boring No.		Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-1	at	2.5	25.4	0.671			28.0	31.6	40.4	
⊠	B-2	at	1.0	25.4	1.523	0.08		29.8	40.7	29.5	
▲	B-2	at	7.5	19.1	0.15			6.1	51.1	42.9	
★	B-3	at	13.5	19.1	4.817	0.531	0.099	40.3	51.0	8.7	
⊙	I-1	at	6.0	25.4	10.019	1.281	0.034	55.6	32.0	4.7	7.8

US_GRAIN_SIZE BORING LOGS.GPJ F&R.GDT 10/19/16

Froehling & Robertson, Inc.

GRAIN SIZE DISTRIBUTION

Project No: 72U-0127
Client: Hord Coplan Macht, Inc
Project: Parker Gray Stadium Improvements
City/State: Alexandria, Virginia



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring No.		Depth	Classification	LL	PL	PI	Cc	Cu
●	I-2	at	6.0	CLAYEY GRAVEL with SAND (GC)	26	18	8	3.30	382.90
		at							
		at							
		at							
		at							

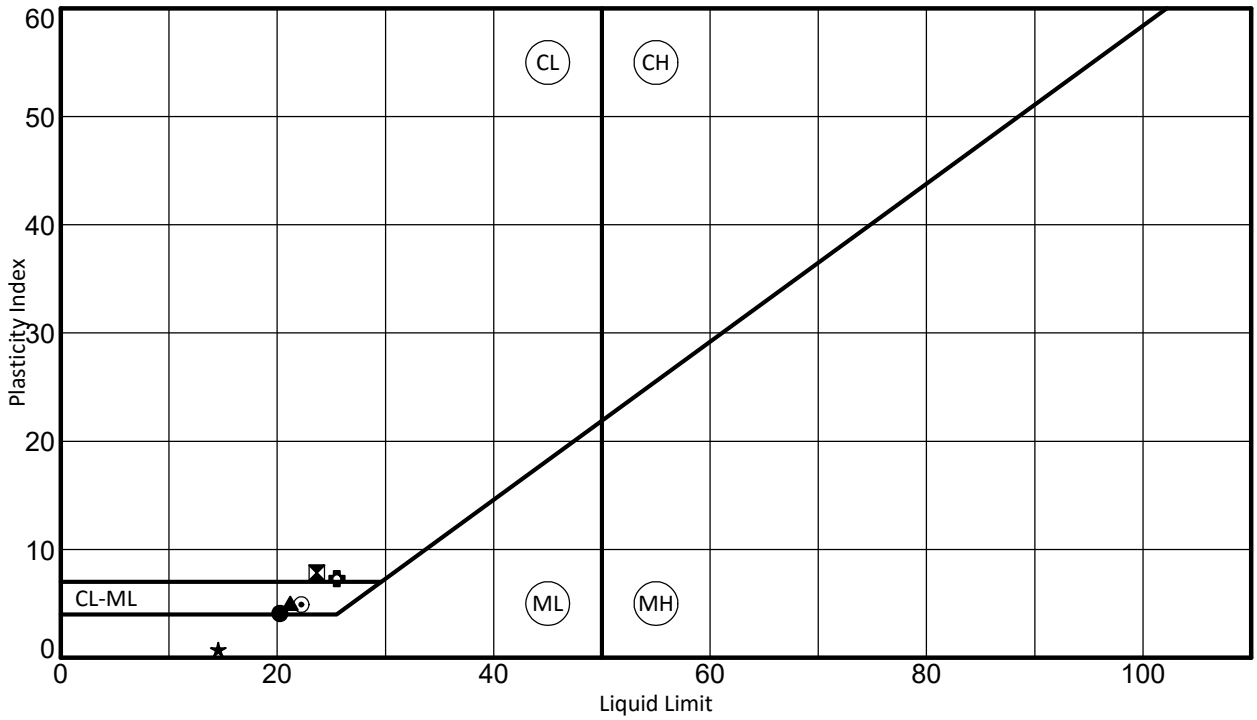
	Boring No.		Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	I-2	at	6.0	19.1	7.222	0.67	0.019	50.0	34.2	8.5	7.3
		at									
		at									
		at									
		at									

US_GRAIN_SIZE BORING LOGS.GPJ F&R.GDT 10/19/16

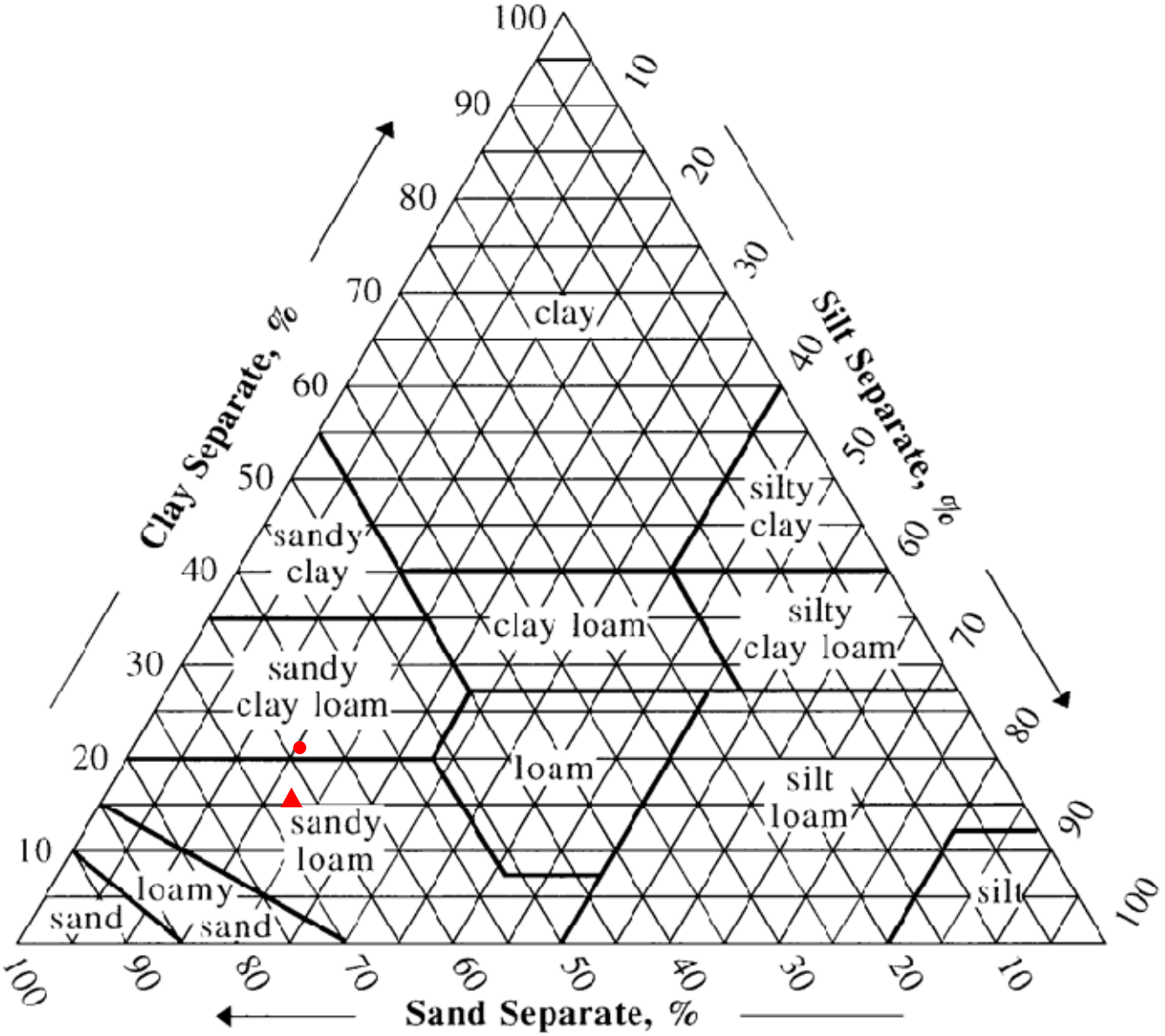
Froehling & Robertson, Inc.

ATTERBERG LIMITS

Project No: 72U-0127
Client: Hord Coplan Macht, Inc
Project: Parker Gray Stadium Improvements
City/State: Alexandria, Virginia



Boring No.		Depth	LL	PL	PI	Fines	Classification	% Natural Water Content
● B-1	at	2.5	20	16	4	40.4	SILTY, CLAYEY SAND with GRAVEL (SC-SM)	15.8
⊠ B-2	at	1.0	24	16	8	29.5	CLAYEY SAND with GRAVEL (SC)	17.2
▲ B-2	at	7.5	21	16	5	42.9	SILTY, CLAYEY SAND (SC-SM)	14.2
★ B-3	at	13.5	15	14	1	8.7	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	3.8
⊙ I-1	at	6.0	22	17	5	12.5	SILTY, CLAYEY GRAVEL with SAND (GC-GM)	5.6
✿ I-2	at	6.0	26	18	8	15.8	CLAYEY GRAVEL with SAND (GC)	6.2



Boring	Depth (ft)	% Sand	% Silt	% Clay	USDA Classification	Symbol
I-1	6.0	65	18.4	5.7	Sandy Clay Loam	●
I-2	6.0	72.9	21.9	5.2	Sandy Loam	▲

FROEHLING & ROBERTSON, INC.
Engineering Stability Since 1881
22923 Quicksilver Drive, Suite 111
Sterling, VA 20166
T 703.996.0123 I F 703.996.0124

USDA Textural Triangle	
Client: hord | coplan | macht, Inc.	
Project: Parker Gray Stadium Improvements	
F&R Project No. 72U0127	
Date: October 2016	Drawing No.: 3

APPENDIX IV

Important Information about Your

Geotechnical-Engineering Report

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

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

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

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you —* should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical-Engineering Report Is Based on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

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

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical-engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical-engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

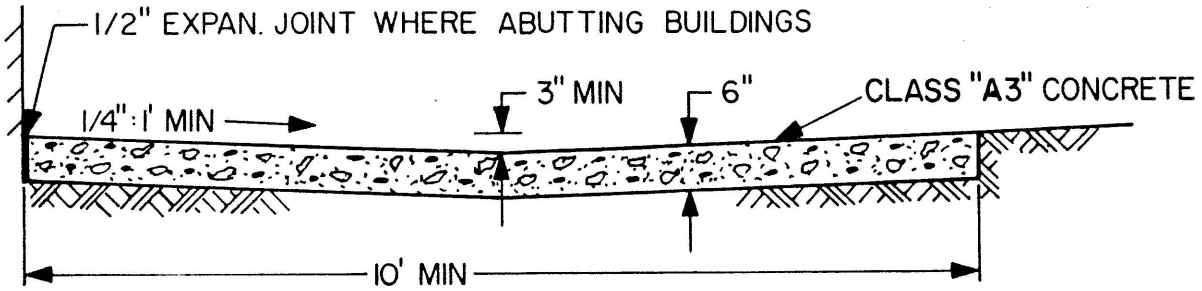
Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold-prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your GBA-Member Geotechncial Engineer for Additional Assistance

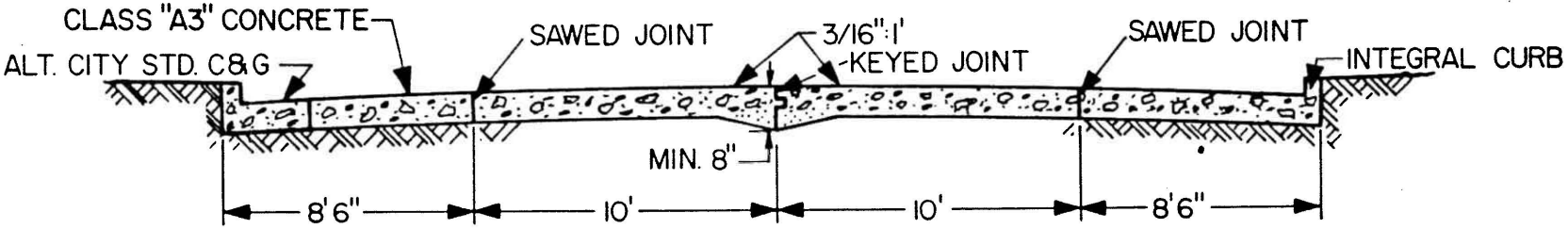
Membership in the GEOPROFESSIONAL BUSINESS ASSOCIATION exposes geotechnical engineers to a wide array of risk confrontaton techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBA-member geotechnical engineer for more information.

GEOPROFESSIONAL BUSINESS ASSOCIATION

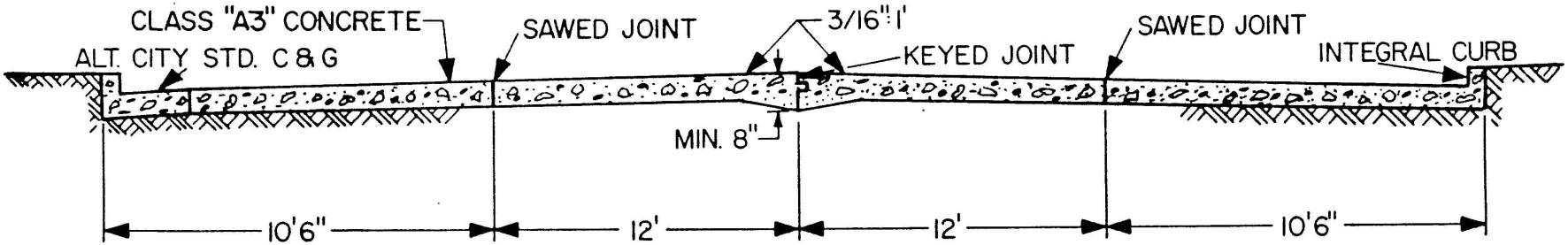
8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org



TYPICAL ALLEY PAVING



36' CONCRETE ROADWAY



44' CONCRETE ROADWAY

NOTES : 1. PAVING THICKNESS AND ANY REINFORCING TO BE SPECIFIED FOR EACH JOB ON THE DESIGN PLANS.

2. INTEGRAL CURB TO BE POURED WITH SLAB, IF SPECIFIED ALT. CITY STD. CURB AND GUTTER MAY BE CONSTRUCTED IN PLACE OF INTEGRAL CURB.

3. LONGITUDIAL JOINTS AT MAX. 18' UNLESS SLAB IS REINFORCED.

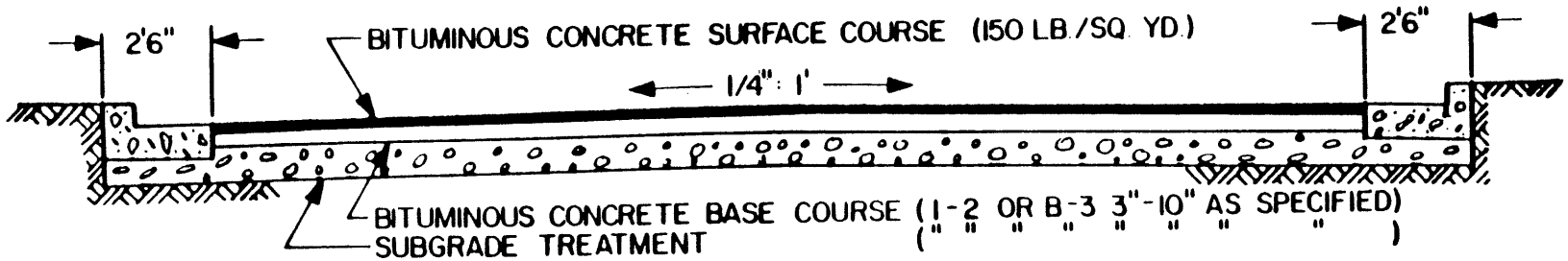
4. SAWED JOINTS TO BE MIN. 1/4 THICKNESS OF SLAB.

REVISIONS:

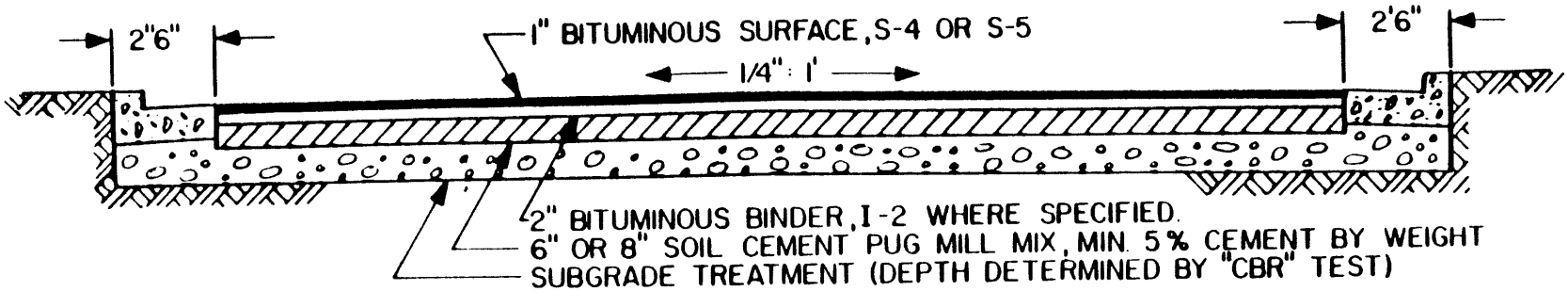
TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

CONCRETE PAVING OF ALLEYS & STREETS

CSCP-1



TYPICAL SECTION-FLEXIBLE BASE (ASPHALTIC CONCRETE)



TYPICAL SECTION-RIGID BASE (SOIL CEMENT)

NOTE 1. 12 1/2" MIN. FROM BASE OF SUBGRADE TREATMENT TO SURFACE.

REVISIONS

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

ASPHALT PAVING

CSAP-1

ADDENDUM # 1
Parker Gray Field
March 30, 2020

This document shall become attached to and part of the Construction Documents for the aforementioned project.

ADDENDUM REVISION DESCRIPTION

Provided additional clarification to various electrical items described below:

DRAWINGS

ITEM	SHEET NO.	DESCRIPTION
E1	E0.00	Added ground symbols to riser for clarification (keynote number 11). Scope of work was always required based on Specification Section 260526.
E2	E0.00	Removed extra conduit running from pressbox to the panel DPL.
E3	E0.00	Changed incoming service entrance feeder size (keynote #4).
E4	E0.00	Changed T112.5 system bonding jumper size from #3 to #1/0 (keynote #6).
E5	E0.01	Changed breaker number 24 in panel L1 from 40A to 35A.
E6	E0.01	Changed electrical information in the "EQUIPMENT CONNECTION SCHEDULE" for DWH-1.
E7	E0.01	Removed un-used, load from circuit number 12 in panel DPL.
E8	E0.01	Changed bus and MCB rating for panel DPH
E9	E0.01	Changed integral surge suppression rating for panel DPH.
E10	E0.01	Changed wire size for circuit number 8 from #12 to #10 AWG and from ¾" to 1" conduit.
E11	E1.01	Changed power distribution at the scoreboard from field mounted and wired disconnects and transformer to a mini-power center with integral circuit breakers, disconnects, and transformer (keynote number 5).
E12	E1.01	Added a 2" empty conduit routed from the press box to the scoreboard for communication wiring (keynote number 7). Provide this cost in the base bid as a separate line item.
E13	E1.02p	Revised light pole height from 80' to 70' for athletic pole lights F3 and F4 to match Musco drawings.

END OF ADDENDUM # 1

Q:\HCM\16126 - PARKER GRAY FIELD\C_BID\2_ADDENDA\ADDENDUM 1

ELECTRICAL LEGEND

CONDUIT SYMBOLS

- CONDUIT OR CABLE UP
- CONDUIT OR CABLE DOWN
- CIRCUIT HOMERUN
- SWITCHED CIRCUIT LEG (LIGHTING)
- UNSWITCHED CIRCUIT LEG (LIGHTING)
- CONDUIT UNDERGROUND OR UNDERSLAB
- BREAK
- GROUNDING CONDUCTOR

WIRING DEVICE SYMBOLS

- S_x WALL SWITCH AT +1'-6" AFF TO BOTTOM OF BOX. SUBSCRIPTS INDICATE THE FOLLOWING:
  - (NONE) SINGLE POLE
  - O OCCUPANCY SENSOR
  - T TIMER
  - V VACANCY SENSOR
- OS CORNER MOUNT OCCUPANCY SENSOR
- OS CEILING MTD OCCUPANCY SENSOR
- PHOTOCELL
- DUPLEX RECEPTACLE AT 18" AFF OR GRADE, UNO. SUBSCRIPTS INDICATE THE FOLLOWING:
  - GF GROUND FAULT CIRCUIT INTERRUPTER
  - WP WEATHERPROOF AND GFCI TYPE
- DUPLEX RECEPTACLE AT 42" AFF OR MOUNTED 6" ABOVE COUNTER. COORD ELEVATION WITH CASEWORK AND ARCHITECT
- INV EMERGENCY LIGHTING INVERTER, 2.2 KVA, 277V MEYER'S ILLUMINATOR EM, OR APPROVED EQUAL

POWER DISTRIBUTION

- PANELBOARD, SURFACE MOUNTED, 120/208V
- PANELBOARD, SURFACE MOUNTED, 277/480V
- T TRANSFORMER
- DASHED LINES INDICATE REQUIRED CLEARANCES AROUND ELECTRICAL EQPT
- DISCONNECT SWITCH, 30A UNO.
- FUSIBLE DISCONNECT SWITCH, 30A UNO.
- CB ENCLOSED CIRCUIT BREAKER, 20A UNO.
- E EQUIPMENT CONNECTION

INTERIOR LIGHT FIXTURES

- LINEAR LIGHT FIXTURE

EXTERIOR LIGHT FIXTURES

- EXTERIOR BLDG MOUNTED LIGHT FIXTURE
- POLE LIGHT FIXTURE
- B2 FIELD LIGHT FIXTURE "B2" INDICATES FIXTURE POLE DESIGNATION

ABBREVIATIONS

A	AMPERE
AFF	ABOVE FINISHED FLOOR
AWG	AMERICAN WIRE GAUGE
A/E	ARCHITECT/ENGINEER
BLDG	BUILDING
BRKR	BREAKER
CIRC	CIRCULATION
CKT	CIRCUIT
CLG	CEILING
COMM	COMMUNICATION
CONC	CONCRETE
C.CND	CONDUIT
CT	CURRENT TRANSFORMER
CTR	CENTER
CTRL	CONTROL
CU	COPPER
DISC	DISCONNECT
DIV	DIVISION
DWG	DRAWING
DWH	DOMESTIC WATER HEATER
EF	EXHAUST FAN
ELEC	ELECTRIC
EMT	ELECTRIC METALLIC TUBING
EQPT	EQUIPMENT
EUH	ELECTRIC UNIT HEATER
FC	FOOT CANDLES
FLR	FLOOR
FT	FOOT,FEET
GEC	GROUNDING ELECTRODE CONDUCTOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
G,GND	GROUND
HP	HORSEPOWER
HVAC	HEATING, VENTILATION, AIR CONDITIONING
HW	HOT WATER UNIT HEATER
HZ	HERTZ
JB	JUNCTION BOX
KAIC	1,000 AMPERE INTERRUPTING CURRENT
kcmil	THOUSAND CIRCULAR MILS
KW	KILOWATT
KVA	KILOVOLT AMPERE
LTG	LIGHTING
LTS	LIGHTS
LV	LOW VOLTAGE
MAX	MAXIMUM
MB	MAIN BREAKER
MFR	MANUFACTURER
MH	MOUNTING HEIGHT (AFF UNO)
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MTD	MOUNTED
N	NEUTRAL
NEMA	NATIONAL ELECTRICAL MFRS ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION AGENCY
NTS	NOT TO SCALE
OCPD	OVER CURRENT PROTECTIVE DEVICE
P	POLE
PH	PHASE
PNL	PANEL
PWR	POWER
QTY	QUANTITY
REC	RECEPTACLE
REQD	REQUIRED
RM	ROOM
SE	SERVICE ENTRANCE
SECT	SECTION
SF	SQUARE FEET
STRTR	STARTER
SURF	SURFACE
SW	SWITCH
TEL	TELEPHONE
THRU	THROUGH
TYP	TYPICAL
UL	UNDERWRITER LABORATORIES
UNO	UNLESS NOTED OTHERWISE
V	VOLTS
VUSBC	VIRGINIA UNIFORM STATEWIDE BUILDING CODE
W	WATTS
WP	WEATHERPROOF
WTR	WATER
XFMR	TRANSFORMER

GENERAL NOTES

NEW WORK

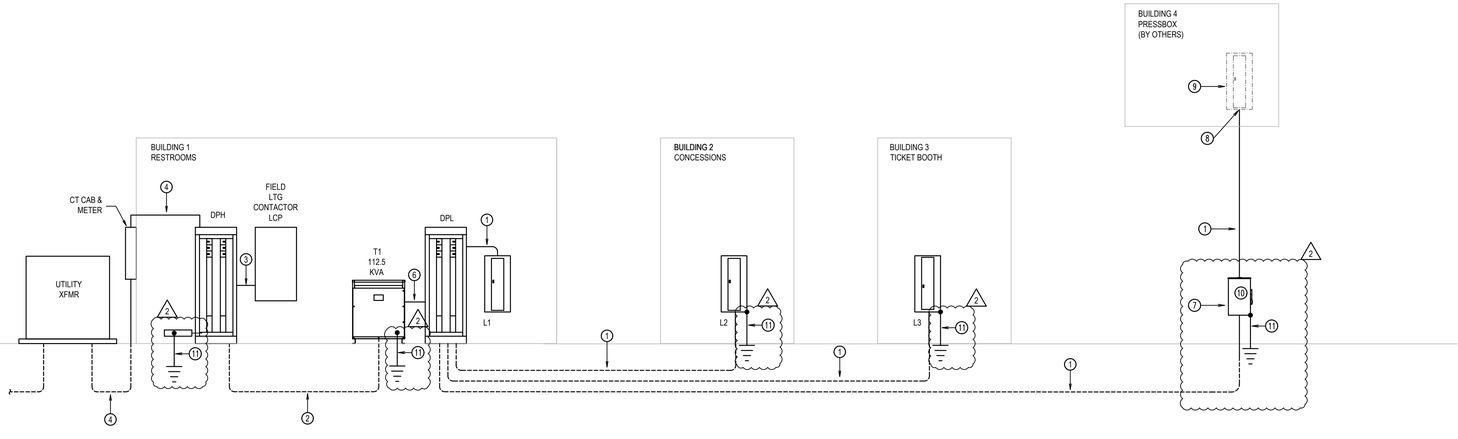
1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH VUSBC 2015, 2014 NEC AND LOCAL CODES AS REQUIRED BY AUTHORITY HAVING JURISDICTION (AHJ).
2. COORDINATE ALL WORK WITH THE CONSTRUCTION COMPLETION SCHEDULE SPECIFIED FOR THE PROJECT AND WITH ALL OTHER TRADES TO ENSURE THAT PROJECT IS COMPLETED ON SCHEDULE.
3. THE CONTRACTOR SHALL INCLUDE IN THEIR PRICE AFTER HOURS LABOR AND / OR WEEKEND LABOR FOR ALL WORK REQUIRED TO MEET MILESTONE DEADLINES AND CONSTRUCTION COMPLETION SCHEDULE.
4. PAY FOR AND OBTAIN ALL PERMITS UPON COMPLETION OF WORK. PRESENT THE OWNER WITH A CERTIFICATE FOR FINAL INSPECTION FROM THE LOCAL AUTHORITY.
5. MOUNTING HEIGHTS, UNLESS OTHERWISE NOTED, ARE TO CENTER LINE OF EQUIPMENT, EXCEPT MOUNTING HEIGHTS OF LIGHTING FIXTURES WHICH IS TO BOTTOM OF FIXTURE, UNLESS NOTED OTHERWISE.
6. ALL CND AND WIRING SHALL BE RUN CONCEALED ABOVE FINISHED CEILINGS, WITHIN WALLS, OR BELOW FLOORS IN FINISHED SPACES.
7. PLACE JUNCTION BOXES IN ACCESSIBLE LOCATIONS ABOVE CEILINGS. ENSURE THAT ACCESS TO PULL OR J BOXES IS NOT BLOCKED. DO NOT LOCATE PULL OR J BOXES DIRECTLY ABOVE OTHER EQUIPMENT LOCATED IN THE CEILING SPACE.
8. WHERE LIGHT SWITCHES ARE INDICATED TO BE MOUNTED BACK OF DOOR, THEY SHALL BE MOUNTED A MINIMUM OF 3'-4" FROM HINGED SIDE.
9. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR CEILING TYPES AND EXACT LOCATIONS OF LIGHTING FIXTURES. REFER TO ARCHITECTURAL INTERIOR ELEVATIONS FOR SPECIFIC LOCATIONS OF WALL-MOUNTED DEVICES. COORDINATE WITH WALL FRAMING TO ACHIEVE LOCATIONS INDICATED ON CEILINGS AND WALLS.
10. MECHANICAL AND PLUMBING EQUIPMENT IS SHOWN IN APPROXIMATE LOCATIONS. FOR EXACT LOCATION OF MECHANICAL AND PLUMBING EQUIPMENT AND PIPING, SEE MECHANICAL AND PLUMBING DRAWINGS.
11. PROVIDE FUSES IN ALL FUSED SWITCHES. FUSE RATINGS SHALL BE IN ACCORDANCE WITH EQPT MFR'S RECOMMENDATIONS.
12. DIVISION 26 CONTRACTOR SHALL INCLUDE IN HIS PRICE COORDINATION AND CONNECTION OF ALL HVAC, PLUMBING AND OTHER CONTRACTOR OR OWNER FURNISHED EQUIPMENT. CHECK EQUIPMENT SHOP DRAWINGS AND COORDINATE WITH HVAC, PLUMBING AND ALL OTHER EQUIPMENT CONTRACTORS FOR DISCONNECT SWITCH, CONDUIT, WIRING REQUIREMENTS, FUSE AND BREAKER SIZES AND VOLTAGE REQUIREMENTS. ADDITIONAL PAYMENT FOR CONTRACTOR'S FAILURE TO COORDINATE OVERCURRENT PROTECTION WITH NAMEPLATE DATA REQUIREMENTS OF ACTUAL EQUIPMENT PURCHASED WILL NOT BE CONSIDERED.
13. ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL EXTERNAL STARTERS FOR MECHANICAL EQUIPMENT, UNLESS OTHERWISE NOTED ON MECHANICAL DRAWINGS.
14. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH MECHANICAL AND PLUMBING CONTRACTORS AND SHALL PROVIDE NEUTRAL CONDUCTORS WHERE REQUIRED.
15. THE ELECTRICAL CONTRACTOR(S) SHALL COORDINATE THEIR WORK WITH ALL TRADES PRIOR TO FABRICATION OF SYSTEMS AND COMMENCEMENT OF INSTALLATION, AND PRIOR TO ANY PROCUREMENT OF MATERIALS. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO REVIEW THE WORK OF OTHER TRADES (INCLUDING, BUT NOT LIMITED TO STRUCTURAL, ARCHITECTURAL, CIVIL, MECHANICAL, PLUMBING AND AV) AS IT AFFECTS THE ELECTRICAL WORK, AND AS THE ELECTRICAL WORK AFFECTS OTHER TRADES TO ENSURE THE CONSTRUCTION DOCUMENTS ARE CLOSELY FOLLOWED. WHERE DISCREPANCIES ARISE, THEY SHALL BE REFERRED TO THE A/E FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.
16. THE DESIGN IS BASED ON MFRS AND MODELS INDICATED AND IS INTENDED TO SHOW THE GENERAL SIZE, CONFIGURATION, LOCATION, CONNECTIONS, AND/OR SUPPORT FOR EQUIPMENT OR SYSTEMS WITH RELATION TO THE OTHER BUILDING/SYSTEMS. SEE SPECIFICATION SECTIONS FOR TECHNICAL REQUIREMENTS.

FIRESTOPPING GENERAL NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR REVIEWING THE ARCHITECTURAL DRAWINGS PRIOR TO SUBMITTING THEIR BID PRICE. THE CONTRACTOR SHALL INCLUDE IN THEIR BID PRICE ALL REQUIRED FIRESTOPPING WHETHER OR NOT INDICATED ON THE ELECTRICAL DRAWINGS.
2. MAINTAIN FIRE RATINGS WHERE ELECTRICAL ITEMS PENETRATE FIRE RATED BUILDING ELEMENTS. PROVIDE UL LISTED FIRESTOPPING SYSTEM FOR EACH PENETRATION. GROUP CONDUITS/CABLES TOGETHER TO REDUCE QUANTITY OF PENETRATIONS WHEREVER POSSIBLE.
3. PROVIDE FIRESTOPPING OR ANNULAR SPACE PROTECTION AT ALL PENETRATIONS IN ACCORDANCE WITH 2015 VUSBC AND PROJECT SPECIFICATIONS.

KEY NOTES

1. REFER TO PANEL DPL SCHEDULE FOR FEEDER SIZE.
2. REFER TO PANEL DPH SCHEDULE FOR FEEDER SIZE.
3. REFER TO PANEL AND ATHLETIC LIGHTING FIXTURE SCHEDULES FOR CONDUITS AND WIRE SIZES
4. 2 SETS: 4-250KCMIL, 3"C.
5. SEE CIVIL DRAWINGS FOR PRIMARY FEED TO TRANSFORMER.
6. 2 SETS: 4#3/0, 1#1/0, 2-1/2"C.
7. COORD DISCONNECT LOCATION WITH ARCHITECT AND BLEACHERS SUPPLIED TO PROJECT.
8. CONNECT TO PANEL SUPPLIED WITH PRESSBOX BOOTH.
9. PANEL TO BE PROVIDED WITH PRESSBOX.
10. 100A FUSED DISCONNECT SWITCH, NEMA 3R ENCLOSURE. DISCONNECT TO BE SERVICE ENTRANCE RATED.
11. PROVIDE GROUNDING IN ACCORDANCE WITH THE NEC. REFER TO THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.



1 E0.00 RISER DIAGRAM

SCALE: NONE

SHEET LIST - ELECTRICAL

SHEET NO	SHEET NAME
E0.00	LEGEND, RISERS
E0.01	SCHEDULES
E0.02	DETAILS
E1.01	SITE PLAN
E1.02	ATHLETIC PHOTOMETRICS PLAN
E1.03	BUILDINGS 1,2 & 3 FLOOR PLANS

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WILLIAMS

ACPS T.C. WILLIAMS H.S. - PARKER-GRAY STADIUM RENOVATION

3330 KING STREET
ALEXANDRIA, VA 22302

hord | coplan | macht

ARCHITECTURE

LANDSCAPE ARCHITECTURE

PLANNING

INTERIOR DESIGN

COMMONWEALTH OF VIRGINIA
NEAL A. CRAMER
Lic. No. 41825
PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION. I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF VIRGINIA
LICENSE NUMBER:
EXPIRATION DATE:

no.	date	revision
1	2020.03.30	ADDENDUM 1

Project Name
ACPS T.C. WILLIAMS H.S. - PARKER-GRAY STADIUM RENOVATION
Project Number
216127.00

Date
2019.03.06

Scale
As Indicated

Drawing
LEGEND, RISERS

E0.00

CONSTRUCTION DOCUMENTS

9/25/2017 3:36:37 PM
C:\HCM\16126 - Parker Gray Field\E_Design\11_Dwg Arch\716810 SD Set\2017_09_15_ACPS Parker-Gray Stadium.rvt

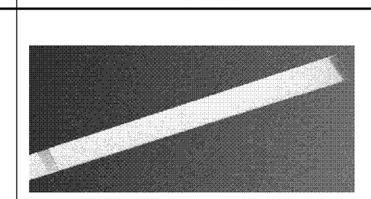
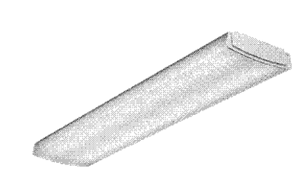
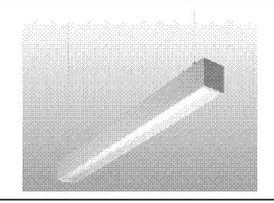
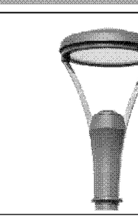
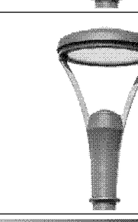
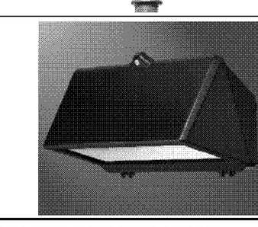
PANEL NO.:	DPH	BUS AMPS:	400A	FED FROM:	Utility Xfmr	INTEGRAL SPD:	240 kA/PHASE
PHASES:	3	MAIN CB AMPS:	400A	MOUNTING:	PAD	LOCATION:	ELECTRICAL ROOM
VOLTS	480V	AIC RATING:	30,822 MINIMUM	PANEL TYPE:	SWITCHBOARD	USAGE:	SERVICE ENTRANCE

CIRCUIT					LOAD	DESCRIPTION	NOTES	BREAKER					BREAKER		NOTES	DESCRIPTION	LOAD	CIRCUIT				
SETS	WIRE	NEUT.	GND.	COND.	AMPS.			POLE	AMP.				AMP.	POLE			AMPS.	SETS	WIRE	NEUT.	GND.	COND.
1	#3/0	-	#6	2"	107.2	DPL (VIA XFMR-1)		3	200	1	A	2	30	3		ATHLETIC LTG CONTACTOR 1	21.7	1	#8	#8	#10	1"
					127.3						B						21.7					
					93.7						C						21.7					
1	#8	#8	#10	1"	21.7	ATHLETIC LTG CONTACTOR 2		3	30	3	A	4	30	3		ATHLETIC LTG CONTACTOR 3	21.7	1	#8	#8	#10	1"
					21.7						B						21.7					
					21.7						C						21.7					
1	#8	#8	#10	1"	21.7	ATHLETIC LTG CONTACTOR 4		3	30	5	A	6	20	1		EMERGENCY LTG INVERTER	5.8	1	#12	#12	#12	3/4"
					21.7						B		20	1		SITE LIGHTING	3.6	1	#10	#10	#12	1"
					21.7						C			1		SPACE	0.0					
					0.0	SPACE		3		7	A	8	20	2		XFMR-SB	15.6	1	#10	#10	#10	1"
					0.0	SPACE					B						15.6					
					0.0	SPACE					C			1		SPACE	0.0					
					0.0	SPACE		3		9	A	10		3		SPACE	0.0					
					0.0	SPACE					B					SPACE	0.0					
					0.0	SPACE					C					SPACE	0.0					
					0.0	SPARE		3	60	11	A	12	60	3		SPD	0.0	1	#6	#6	#10	1"
					0.0						B						0.0					
					0.0						C						0.0					

LOAD SUMMARY	CON. KVA	%	DEM. KVA
RECEPTACLES	3.24	code	3.24
MOTORS	7.64	100%	7.64
LIGHTS (INT.)	0.75	100%	0.75
LIGHTS (EXT.)	74.89	100%	74.89
HVAC (HEAT)	46.2	100%	46.2
HVAC (COOL)	0	100%	0
VENTILATION	0	100%	0
KITCHEN	0	65%	0
EMERGENCY	0	100%	0
MISC.	33.34	100%	33.34
FUTURE	0	100%	0
OTHER	7	100%	7
TRACK	0	100%	0
LARGEST MTR	0	25%	0
TOTAL KVA	173 KVA		173 KVA
TOTAL AMPS	208 AMPS		208 AMPS

PANEL NOTES:
1. ADJUST ALL CONDUCTOR SIZES FOR VOLTAGE DROP AS REQUIRED.
2.
3.
4.
5.
6.

LIGHTING FIXTURE SCHEDULE

MARK	IMAGE	DESCRIPTION	MFR/MODEL (BASIS OF DESIGN)	MTG	SOURCE	REMARKS
R1		RECESSED 4' LINEAR LED WET LOCATION 1415 LUMENS, 3000K, 80CRI	FINELITE HP-4 WL R 4' S 830 F 120V	R/C	14.1W LED	
S1		LOW PROFILE 4' CEILING MOUNTED LED 6000 LUMENS, 3000K, 80CRI	LITHONIA LBL4 6000LM 80CRI 30K MVOLT	S/C	50W LED	
SP1		SUSPENDED 4' CONTINOUS LINEAR LED 3200 LUMENS, 3000K, 80CRI	WILLIAMS LX4 D L12 830 D UNV	SUSP	31W LED	REFER TO ARCHITECTURAL DRAWINGS FOR MOUNTING HEIGHT.
ST1		POST TOP MOUNTED LED FIXTURE 4300 LUMENS, 4500K, 70CRI 12' POLE.	SOLANA PT SL660 FG 42L45T5 MDL03 POLE: 4SQ 12	POLE	49W LED	COLOR TO BE SELECTED BY ARCHITECT. SEE NOTE #9
ST2		POST TOP MOUNTED LED FIXTURE 4300 LUMENS, 4500K, 70CRI 12' POLE.	SOLANA PT SL660 FG 42L45T2 MDL03 POLE: 4SQ 12	POLE	49W LED	COLOR TO BE SELECTED BY ARCHITECT. SEE NOTE #9
W1		WALL MOUNTED OUTDOOR ARCHITECTURAL SCONCE, 1500 LUMENS, 4000K, 73CRI	LUMARK LD WP FC 3B 120V EMLED-CD PE	W	27W LED	REFER TO ARCHITECTURAL DRAWINGS FOR MOUNTING HEIGHT.

BASIS OF DESIGN STATEMENT:

THE DESIGN SHOWN IS BASED ON THE MANUFACTURERS AND MODELS INDICATED AND IS INTENDED ONLY TO SHOW THE GENERAL SIZE, CONFIGURATION, LOCATION, CONNECTIONS AND/OR SUPPORT FOR THE EQUIPMENT OR SYSTEMS SPECIFIED WITH RELATION TO THE OTHER BUILDING SYSTEMS. SEE DIV 26 SPECIFICATION SECTIONS FOR ADDITIONAL TECHNICAL REQUIRMENTS.

KEY:
- R/C RECESSED / CEILING
- SUSP SUSPENDED
- S/C SURFACE / CEILING
- W WALL

NOTES:
1. REFER TO LIGHTING PLANS FOR CHEVRONS AND FACES.
2. FIXTURES ON SCHEDULE ARE TYPICALLY INDICATED FOR GRID TYPE INSTALLATION. IN INSTANCES WHERE CEILING TYPE DIFFERS, PROVIDE FIXTURES AS INDICATED AND DESIGNED FOR THAT APPLICATION. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS.
3. ALL FIXTURES SHALL BE PROVIDED COMPLETE WITH ALL NECESSARY ACCESSORIES.
4. LED FIXTURES SHALL HAVE RATED LIFE BASED ON IESNA LM-80 AND PHOTOMETRIC PERFORMANCE TESTED IN ACCORDANCE WITH IESNA 79.
5. ALL LIGHT SOURCES SHALL HAVE MINIMUM CRI OF 80 UNO.
6. ALL FIXTURES SHALL BE RATED 120/277 MULTI-VOLT UNO.
7. PROVIDE EMERGENCY BATTERY BACKUP FOR FIXTURES WHERE INDICATED ON PLANS. MINIMUM 1300 LUMEN OUTPUT, EXCEPT DOWNLIGHTS, 700 LUMEN OUTPUT.
8. SUBSTITUTE FIXTURES, IF PERMITTED, SHALL BE WITHIN:
   5% +/- OF SPECIFIED FIXTURE(S) LUMEN OUTPUT AND POWER CONSUMPTION FOR FIXTURES 2000 LUMENS AND BELOW
   10% +/- OF SPECIFIED FIXTURE(S) LUMEN OUTPUT AND POWER CONSUMPTION FOR FIXTURES ABOVE 2000 LUMENS
9. CONTRACTOR TO SELECT POLE THICKNESS BASED ON FIXTURE EPA IN 90 MPH ZONE.

GENERAL NOTES — FIXTURE SCHEDULE

1. CONTRACTOR SHALL PROVIDE SUITABLE TRIM AND APPURTENANCES TO MOUNT FIXTURES IN TYPE OF CEILING OR WALL AS SPECIFIED BY ARCHITECTURAL FINISH SCHEDULES REGARDLESS OF CATALOG NUMBER GIVEN. CONTRACTOR SHALL VERIFY REQUIRED FIXTURE INSTALLATION APPENDAGES PRIOR TO ORDERING FIXTURES.
2. FIXTURES SHALL BE SUPPORTED FROM THE STRUCTURE AS STATED IN THE SPECIFICATIONS OR AS APPROVED BY THE ENGINEER.
3. ELECTRICAL CONTRACTOR SHALL VERIFY LIGHTING FIXTURE REQUIREMENTS AGAINST ARCHITECTURAL PLANS WITH SPECIFICS TO, BUT NOT LIMITED TO, CUSTOM ARCHITECTURAL SOFFITS AS SHOWN ON ANY PLANS.
4. FINISHES FOR LIGHTING FIXTURES AND COLORS SHALL BE APPROVED BY ARCHITECT.
5. COORDINATE MOUNTING HEIGHTS FOR ALL WALL MOUNTED FIXTURES WITH ARCHITECTURAL ELEVATIONS.

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PANEL NO.:	DPL	BUS AMPS:	400A	FED FROM:	XFMR-1	INTEGRAL SPD:	NONE
PHASES:	3	MAIN CB AMPS:	400A	MOUNTING:	SURFACE	LOCATION:	ELECTRICAL ROOM
VOLTS	208V	AIC RATING:	10,000 MINIMUM	PANEL TYPE:	POWER DISTRIBUTION	USAGE:	BRANCH CIRCUIT

CIRCUIT					LOAD	DESCRIPTION	NOTES	BREAKER		CKT.		CKT.	BREAKER		NOTES	DESCRIPTION	LOAD	CIRCUIT				
SETS	WIRE	NEUT.	GND.	CND.	AMPS.			POLE	AMP.	#		#	AMP.	POLE			AMPS.	SETS	WIRE	NEUT.	GND.	CND.
1	#4/0	#4/0	#4	2-1/2"	129.3	L1		3	225	1	A	2	150	3		L2	44.5	1	#1/0	#1/0	#6	1-1/2"
					117.1					3	B	4					98.6					
					133.7					5	C	6					74.2					
1	#6	#6	#10	1"	4.4	L3		3	60	7	A	8	100	2		PRESSBOX LOADCENTER (VIA DSW-PB)	80.0	1	#3/0	#3/0	#8	2"
					8.7					9	B	10					80.0					
					8.3					11	C	12		1		SPACE	0.0					
					0.0	SPACE		1		13	A	14		1		SPACE	0.0					
					0.0	SPACE		1		15	B	16		1		SPACE	0.0					
					0.0	SPACE		1		17	C	18		1		SPACE	0.0					
					0.0	SPACE		1		19	A	20		1		SPACE	0.0					
					0.0	SPACE		1		21	B	22		1		SPACE	0.0					
					0.0	SPACE		1		23	C	24		1		SPACE	0.0					
					0.0	SPACE		1		25	A	26		1		SPACE	0.0					
					0.0	SPACE		1		27	B	28		1		SPACE	0.0					
					0.0	SPACE		1		29	C	30		1		SPACE	0.0					
					0.0	SPACE		1		31	A	32		1		SPACE	0.0					
					0.0	SPACE		1		33	B	34		1		SPACE	0.0					
					0.0	SPACE		1		35	C	36		1		SPACE	0.0					
					0.0	SPACE		1		37	A	38		1		SPACE	0.0					
					0.0	SPACE		1		39	B	40		1		SPACE	0.0					
					0.0	SPACE		1		41	C	42		1		SPACE	0.0					

PANEL NOTES:
1. ADJUST ALL CONDUCTOR SIZES FOR VOLTAGE DROP AS REQUIRED.
2.
3.
4.
5.
6.

	CONN.	DEM.
TOTAL KVA	91.0	91.0
TOTAL AMPS	252.5	252.5

GENERAL NOTES — PANELBOARDS

1. ALL PANELS ARE TO HAVE SEPARATE NEUTRAL AND EQUIPMENT GROUNDING BUSES.
2. ALL TERMINATIONS ON PANELS SHALL HAVE DUAL RATED 60/75°C LUGS.
3. CIRCUIT AND CONDUIT SIZES ARE BASED UPON COPPER CONDUCTORS.
4. PROVIDE DETAILED TYPED PANEL SCHEDULE IN EACH PANEL BASED ON AS-BUILT CONDITIONS FOR ALL CONNECTED CIRCUITS.
5. WHERE 'SPARE' IS INDICATED IN PANEL SCHEDULES, PROVIDE COMPLETE OPERATIONAL SPARE BREAKER. WHERE NO SIZE IS INDICATED, PROVIDE 20A 1-POLE BREAKER.

ACPS T.C. WILLIAMS H.S. - PARKER-GRAY STADIUM RENOVATION

3330 KING STREET
ALEXANDRIA, VA 22302

PANEL NO.:	L1	BUS AMPS:	225A	FED FROM:	DPL	INTEGRAL SPD:	NONE
PHASES:	3	MAIN CB AMPS:	MLO	MOUNTING:	SURFACE	LOCATION:	BLDG 1, RM 105B
VOLTS	208V	AIC RATING:	10,000 MINIMUM	PANEL TYPE:	LIGHTING AND APPLIANCE	USAGE:	BRANCH CIRCUIT

CIRCUIT					LOAD	DESCRIPTION	NOTES	BREAKER		CKT.		CKT.	BREAKER		NOTES	DESCRIPTION	LOAD	CIRCUIT				
SETS	WIRE	NEUT.	GND.	CND.	AMPS.			POLE	AMP.	#		#	AMP.	POLE			AMPS.	SETS	WIRE	NEUT.	GND.	CND.
1	#12	#12	#12	3/4"	4.5	RECEPTACLES - RM 105A,105B		1	20	1	A	2	20	1		LIGHTING - RM 105A,105B	1.6	1	#12	#12	#12	3/4"
1	#12	#12	#12	3/4"	3.0	RECEPTACLES - RM 103,104		1	20	3	B	4	20	1		LIGHTING - RM 101,102,103,104	4.4	1	#12	#12	#12	3/4"
1	#12	#12	#12	3/4"	3.0	RECEPTACLES - RM 101,102		1	20	5	C	6	20	1		EXTERIOR LIGHTING - BUILDING 1	0.4	1	#12	#12	#12	3/4"
1	#12	#12	#12	3/4"	5.6	EF-1		1	15	7	A	8	15	1		EF-2	5.6	1	#12	#12	#12	3/4"
1	#12	#12	#12	3/4"	2.0	EF-3		1	15	9	B	10	20	1		CHILLED WATER	1.5	1	#12	#12	#12	3/4"
1	#12	#12	#12	3/4"	1.7	LCP		1	20	11	C	12	25	2		EUH-2	19.2	1	#10	#10	#10	3/4"
1	#10	#10	#10	3/4"	19.2	EUH-1		2	25	13	A	14					19.2					
					19.2					15	B	16	20	2		EUH-4	12.5	1	#12	#12	#12	3/4"
1	#10	#10	#10	3/4"	19.2	EUH-3		2	25	17	C	18					12.5					
					19.2					19	A	20	20	2		EUH-6	12.5	1	#12	#12	#12	3/4"
1	#10	#10	#10	3/4"	19.2	EUH-7		2	25	21	B	22					12.5					
					19.2					23	C	24	35	3		DWH-1	25.0	1	#8	#8	#10	3/4"
1	#12	#12	#12	3/4"	5.3	EWH-1		2	20	25	A	26					25.0					
					5.3					27	B	28					25.0					
1	#10	#10	#10	3/4"	19.2	EUH-8		2	25	29	C	30	20	2		EWH-2	5.3	1	#12	#12	#12	3/4"
					19.2					31	A	32					5.3					
1	#12	#12	#12	3/4"	12.5	EUH-5		2	20	33	B	34	20	2		EUH-9	12.5	1	#12	#12	#12	3/4"
					12.5					35	C	36					12.5					
					0.0	SPACE		1		37	A	38	15	1		HWRP-1	0.5	1	#12	#12	#12	3/4"
					0.0	SPACE		1		39	B	40		1		SPACE	0.0					
					0.0	SPACE		1		41	C	42		1		SPACE	0.0					

PANEL NOTES:
1. ADJUST ALL CONDUCTOR SIZES FOR VOLTAGE DROP AS REQUIRED.
2.
3.
4.
5.
6.

	CONN.	DEM.
TOTAL KVA	45.7	45.7
TOTAL AMPS	126.7	126.7

PANEL NO.:	L2	BUS AMPS:	225A	FED FROM:	DPL	INTEGRAL SPD:	NONE
PHASES:	3	MAIN CB AMPS:	150A	MOUNTING:	SURFACE	LOCATION:	BLDG 2, RM 200
VOLTS	208V	AIC RATING:	10,000 MINIMUM	PANEL TYPE:	LIGHTING AND APPLIANCE	USAGE:	BRANCH CIRCUIT

CIRCUIT					LOAD	DESCRIPTION	NOTES	BREAKER		CKT.		CKT.	BREAKER		NOTES	DESCRIPTION	LOAD	CIRCUIT				
SETS	WIRE	NEUT.	GND.	CND.	AMPS.			POLE	AMP.	#		#	AMP.	POLE			AMPS.	SETS	WIRE	NEUT.	GND.	CND.
1	#12	#12	#12	3/4"	1.5	RECEPTACLE - RM 200		1	20	1	A	2	20	1		RECEPTACLE - RM 200	0.0	1	#12	#12	#12	3/4"
1	#12	#12	#12	3/4"	1.5	RECEPTACLE - RM 200		1	20	3	B	4	20	1		RECEPTACLES - RM 200	0.0	1	#12	#12	#12	3/4"
1	#12	#12	#12	3/4"	1.5	RECEPTACLE - RM 200		1	20	5	C	6	20	1		RECEPTACLE - RM 200	0.0	1	#12	#12	#12	3/4"
					0.0	SPACE		1		7	A	8	20	1		LIGHTING - BUILDING 2	0.0	1	#12	#12	#12	3/4"
1	#12	#12	#12	3/4"	14.4	ERH-1		2	20	9	B	10	20	2		ERH-2	14.4	1	#12	#12	#12	3/4"
					14.4					11	C	12					14.4					
1	#12	#12	#12	3/4"	14.4	ERH-3		2	20	13	A	14	20	2		EUH-10	12.5	1	#12	#12	#12	3/4"
					14.4					15	B	16					12.5					
1	#12	#12	#12	3/4"	1.5	EXTERIOR RECEPTACLES - BUILDING 2		1	20	17	C	18	20	1		EXTERIOR LIGHTING - BUILDING 2	0.4	1	#12	#12	#12	3/4"
1	#12	#12	#12	3/4"	1.5	RECEPTACLE - RM 200		1	20	19	A	20	20	1		RECEPTACLES - RM 200	1.5	1	#12	#12	#12	3/4"
1	#12	#12	#12	3/4"	1.5	RECEPTACLE - RM 200		1	20	21	B	22	20	1		EXTERIOR RECEPTACLES - BUILDING 2	1.5	1	#12	#12	#12	3/4"
					0.0	SPACE		1		23	C	24		1		SPACE	0.0					
					0.0	SPACE		1		25	A	26		1		SPACE	0.0					
					0.0	SPACE		1		27	B	28		1		SPACE	0.0					
					0.0	SPACE		1		29	C	30		1		SPACE	0.0					
					0.0	SPACE		1		31	A	32		1		SPACE	0.0					
					0.0	SPACE		1		33	B	34		1		SPACE	0.0					
					0.0	SPACE		1		35	C	36		1		SPACE	0.0					
					0.0	SPACE		1		37	A	38	30	3	2	HYDRAULIC DOOR MOTOR	16.7	1	#10	-	#10	3/4"
1	#8	#8	#10	3/4"	33.7	IWH-1	3	2	35	39	B	40					16.7					
					33.7					41	C	42					16.7					

PANEL NOTES:
1. ADJUST ALL CONDUCTOR SIZES FOR VOLTAGE DROP AS REQUIRED.
2. COORDINATE ELECTRICAL REQUIREMENTS WITH MANUFACTURER.
3. PROVIDE LOCKING TAB FOR BREAKER.
4. PANEL TO BE SERVICE ENTRANCE RATED.
5.
6.

	CONN.	DEM.
TOTAL KVA	26.1	26.1
TOTAL AMPS	72.4	72.4

PANEL NO.:	L3	BUS AMPS:	100A	FED FROM:	DPL	INTEGRAL SPD:	NONE
PHASES:	3	MAIN CB AMPS:	60A	MOUNTING:	SURFACE	LOCATION:	BLDG 3, RM 300
VOLTS	208V	AIC RATING:	10,000 MINIMUM	PANEL TYPE:	LIGHTING AND APPLIANCE	USAGE:	BRANCH CIRCUIT

CIRCUIT					LOAD	DESCRIPTION	NOTES	BREAKER		CKT.		CKT.	BREAKER		NOTES	DESCRIPTION	LOAD	CIRCUIT				
SETS	WIRE	NEUT.	GND.	CND.	AMPS.			POLE	AMP.	#		#	AMP.	POLE			AMPS.	SETS	WIRE	NEUT.	GND.	CND.
1	#12	#12	#12	3/4"	3.0	RECEPTACLES - RM 300		1	20	1	A	2	20	1		LIGHTING - RM 300	0.2	1	#12	#12	#12	3/4"
1	#12	#12	#12	3/4"	9.6	EWH-3		2	20	3	B	4	20	1		EXTERIOR LIGHTING - BUILDING 3	0.4	1	#12	#12	#12	3/4"
					9.6					5	C	6		1		SPACE	0.0					
1	#12	#12	#12	3/4"	1.2	CANOPY LIGHTING		1	20	7	A	8		1		SPACE	0.0					
					0.0	SPACE		1		9	B	10		1		SPACE	0.0					
					0.0	SPACE		1		11	C	12		1		SPACE	0.0					
					0.0	SPACE		1		13	A	14		1		SPACE	0.0					
					0.0	SPACE		1		15	B	16		1		SPACE	0.0					
					0.0	SPACE		1		17	C	18		1		SPACE	0.0					
					0.0	SPACE		1		19	A	20		1		SPACE	0.0					
					0.0	SPACE		1		21	B	22		1		SPACE	0.0					
					0.0	SPACE		1		23	C	24		1		SPACE	0.0					
					0.0	SPACE		1		25	A	26		1		SPACE	0.0					
					0.0	SPACE		1		27	B	28		1		SPACE	0.0					
					0.0	SPACE		1		29	C	30		1		SPACE	0.0					
					0.0	SPACE		1		31	A	32		1		SPACE	0.0					
					0.0	SPACE		1		33	B	34		1		SPACE	0.0					
					0.0	SPACE		1		35	C	36		1		SPACE	0.0					
					0.0	SPACE		1		37	A	38		1		SPACE	0.0					
					0.0	SPACE		1		39	B	40		1		SPACE	0.0					
					0.0	SPACE		1		41	C	42		1		SPACE	0.0					

PANEL NOTES:
1. ADJUST ALL CONDUCTOR SIZES FOR VOLTAGE DROP AS REQUIRED.
2. PANEL TO BE SERVICE ENTRANCE RATED.
3.
4.
5.
6.

	CONN.	DEM.
TOTAL KVA	2.6	2.6
TOTAL AMPS	7.2	7.2

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PLANNING
INTERIOR DESIGN

COMMONWEALTH OF VIRGINIA
NEAL A. CRAMER
Lic. No. 41825
PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION: I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF VIRGINIA
LICENSE NUMBER:
EXPIRATION DATE:

EQUIPMENT CONNECTION SCHEDULE

CONNECTION DESIGNATION	LOAD DESCRIPTION	LOAD INFORMATION						STARTER/DISC INFORMATION					CIRCUIT	NOTES
		VOLTS	PHASE	HP	KVA/KW	AMPS	MOCP	FURN BY	INST BY	NEMA SZ	TYPE	ENCL		
DWH-1	DOMESTIC WATER HEATER	208	3		9.00	25	35	E.C.	E.C.	-	60A NON-FUSED	NEMA 1	L1-24	
EUH-1	ELECTRIC UNIT HEATER	208	1		4.00	19.23	30	MC	MC	N/A	INTEGRAL	N/A	L1-13	
EUH-2	ELECTRIC UNIT HEATER	208	1		4.00	19.23	30	MC	MC	N/A	INTEGRAL	N/A	L1-12	
EUH-3	ELECTRIC UNIT HEATER	208	1		4.00	19.23	30	MC	MC	N/A	INTEGRAL	N/A	L1-17	
EUH-4	ELECTRIC UNIT HEATER	208	1		2.60	12.5	20	MC	MC	N/A	INTEGRAL	N/A	L1-16	
EUH-5	ELECTRIC UNIT HEATER	208	1		2.60	12.5	20	MC	MC	N/A	INTEGRAL	N/A	L1-33	
EUH-6	ELECTRIC UNIT HEATER	208	1		2.60	12.5	20	MC	MC	N/A	INTEGRAL	N/A	L1-20	
EUH-7	ELECTRIC UNIT HEATER	208	1		4.00	19.23	30	MC	MC	N/A	INTEGRAL	N/A	L1-21	
EUH-8	ELECTRIC UNIT HEATER	208	1		4.00	19.23	30	MC	MC	N/A	INTEGRAL	N/A	L1-29	
EUH-9	ELECTRIC UNIT HEATER	208	1		2.60	12.5	20	MC	MC	N/A	INTEGRAL	N/A	L1-34	
EUH-10	ELECTRIC UNIT HEATER	208	1		2.60	12.5	20	MC	MC	N/A	INTEGRAL	N/A	L1-14	
EWH-1	ELECTRIC WALL HEATER	208	1		1.10	5.28	15	MC	MC	N/A	INTEGRAL	N/A	L1-25	
EWH-2	ELECTRIC WALL HEATER	208	1		1.10	5.28	15	MC	MC	N/A	INTEGRAL	N/A	L1-30	
EWH-3	ELECTRIC WALL HEATER	208	1		2.00	9.6	15	MC	MC	N/A	INTEGRAL	N/A	L3-3	
ERH-1	ELECTRIC RADIANT HEATER	208	1		3.00	14.4	20	MC	MC	N/A	INTEGRAL	N/A	L2-9	
ERH-2	ELECTRIC RADIANT HEATER	208	1		3.00	14.4	20	MC	MC	N/A	INTEGRAL	N/A	L2-10	
ERH-3	ELECTRIC RADIANT HEATER	208	1		3.00	14.4	20	MC	MC	N/A	INTEGRAL	N/A	L2-13	
EF-1	EXHAUST FAN	120	1	1/4		3.2	15	MC	MC	N/A	INTEGRAL	N/A	L1-7	1
EF-2	EXHAUST FAN	120	1	1/4		3.2	15	MC	MC	N/A	INTEGRAL	N/A	L1-8	1
EF-3	EXHAUST FAN	120	1	1/10		2	15	MC	MC	N/A	INTEGRAL	N/A	L1-9	1
HWRP-1	HOT WATER CIRCULATION PUMP	120	1	1/12				-	-	-			L1-38	
IWH-1	INSTANTANEOUS WATER HEATER	208	1		7.00	34	35	-	-	-	-	-	L2-39	2
M-1	HYDRAULIC DOOR MOTOR	208	3	5		30	30	E.C.	E.C.	-	30A NON-FUSED	NEMA 1	L2-38	

NOTES:
1. FAN CONTROLLED BY LIGHTING OCCUPANCY SENSOR.
2. PROVIDE LOCKING TAB FOR BREAKER.

no.	date	revision
1	2020.03.30	ADDENDUM 1

Project Name
ACPS T.C. WILLIAMS H.S. - PARKER-GRAY STADIUM RENOVATION

Project Number
216127.00

Date
2019.03.06

Scale
As Indicated

Drawing
SCHEDULES

E0.01

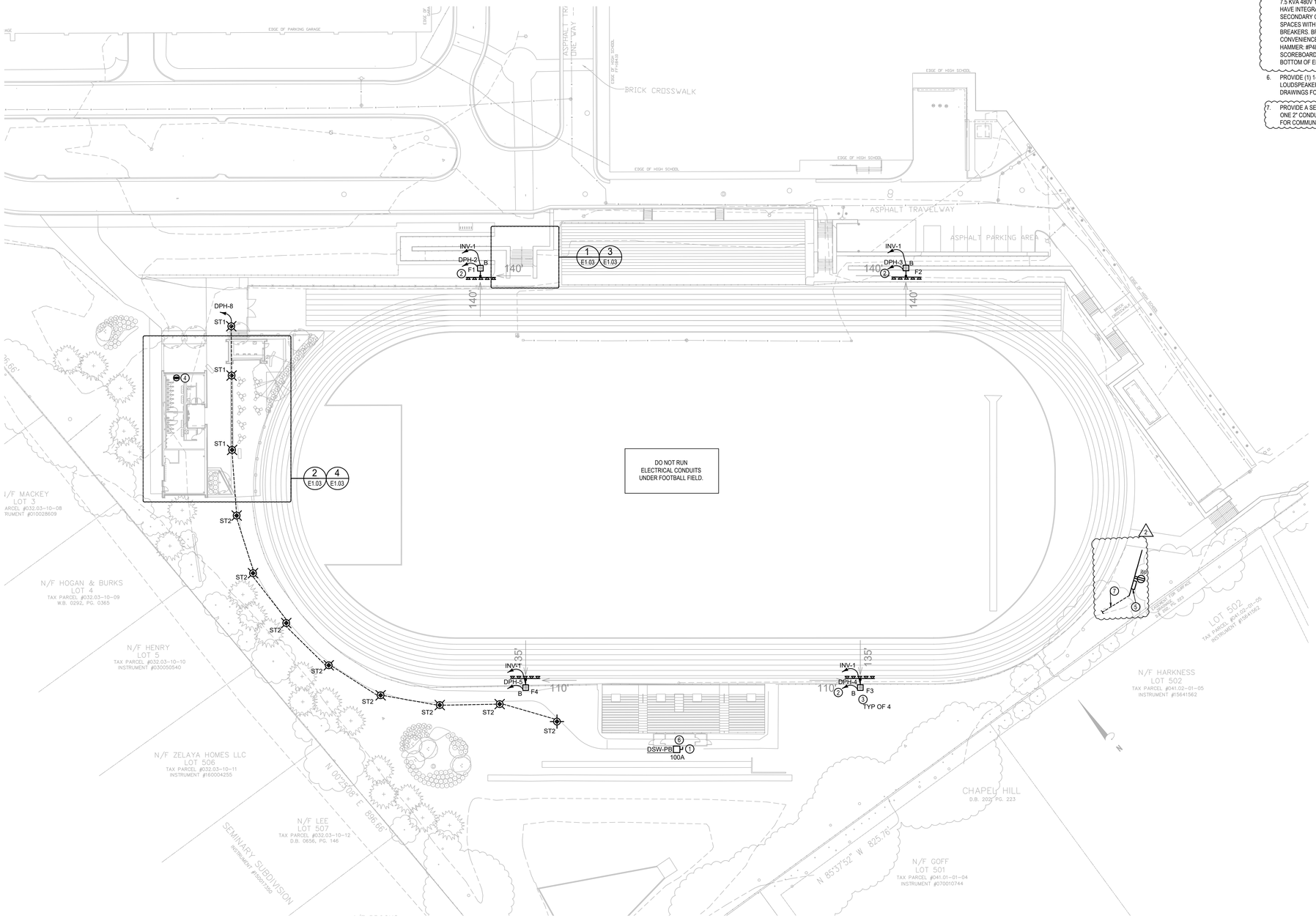
CONSTRUCTION DOCUMENTS

GENERAL NOTES

1. DO NOT INSTALL TYPE ST1 AND ST2 LIGHTING POLE BASES IN SIDEWALK. POLE BASES TO BE LOCATED IN GRASS AREA. COORDINATE WITH CIVIL.

KEY NOTES

1. PRESSBOX WIRING & EQUIPMENT BY OTHERS. COORDINATE POWER CONNECTION LOCATION TO PRESSBOX WITH PRESSBOX INSTALLER. MOUNT SERVICE ENTRANCE RATED NEMA 3R DISCONNECT SWITCH TO PRESSBOX/STANDS STRUCTURE.
2. FIELD LIGHTING HOMERUN. SEE FIELD LIGHTING POLE SCHEDULE FOR CONDUIT AND WIRING SIZE. CIRCUIT TO PANEL DPH. CIRCUIT TO BE ROUTEDTHROUGH FIELD LIGHTING CONTACTOR PANEL. FIELD COORDINATE CONDUIT ROUTING.
3. TYPE-B IN-GROUND PULL BOX. SEE DETAIL ON SHEET E0.02.
4. ST1 AND ST2 POLE MOUNTED FIXTURE CIRCUIT SHALL BE FED THROUGH PHOTOCELL. MOUNT PHOTOCELL TO ROOF, COORDINATE LOCATION WITH ARCHITECT.
5. PROVIDE MINI POWER CENTER IN NEMA 3R ENCLOSURE WITH A 7.5 KVA 480V 1Ø / 120/240V 1Ø XFMR. POWERCENTER SHALL HAVE INTEGRAL PRIMARY DISCONNECTING MEANS AND 35A SECONDARY OVERCURRENT PROTECTION. PROVIDE 12 POLE SPACES WITH (4) 20A, 1 POLE AND (1) 20A, 2 POLE CIRCUIT BREAKERS. BREAKERS TO SERVE SCOREBOARD AND CONVENIENCE RECEPTACLE. BASIS OF DESIGN IS CUTLER HAMMER: #P48G11S0718CUB. MOUNT AT THE BOTTOM OF THE SCOREBOARD STRUCTURE (MINIMUM OF 24" FROM GRADE TO BOTTOM OF ENCLOSURE)
6. PROVIDE (1) 1-1/4" CONDUIT FROM PRESSBOX TO EACH LOUDSPEAKER POLE LOCATION. REFER TO CIVIL AND A/V DRAWINGS FOR LOCATIONS.
7. PROVIDE A SEPARATE LINE ITEM COST IN THE BID TO PROVIDE ONE 2" CONDUIT FROM THE PRESSBOX TO THE SCOREBOARD FOR COMMUNICATION WIRING.



1 -- E1.01 SITE PLAN
SCALE: 1" = 30'-0"
0 15' 30' 60'

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WILLIAMS

ACPS T.C. WILLIAMS H.S. - PARKER-GRAY STADIUM RENOVATION

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ACPS T.C. WILLIAMS H.S. - PARKER-GRAY STADIUM RENOVATION
Project Number
216127.00
Date
2019.03.06
Scale
As Indicated
Drawing
SITE PLAN

E1.01

CONSTRUCTION DOCUMENTS

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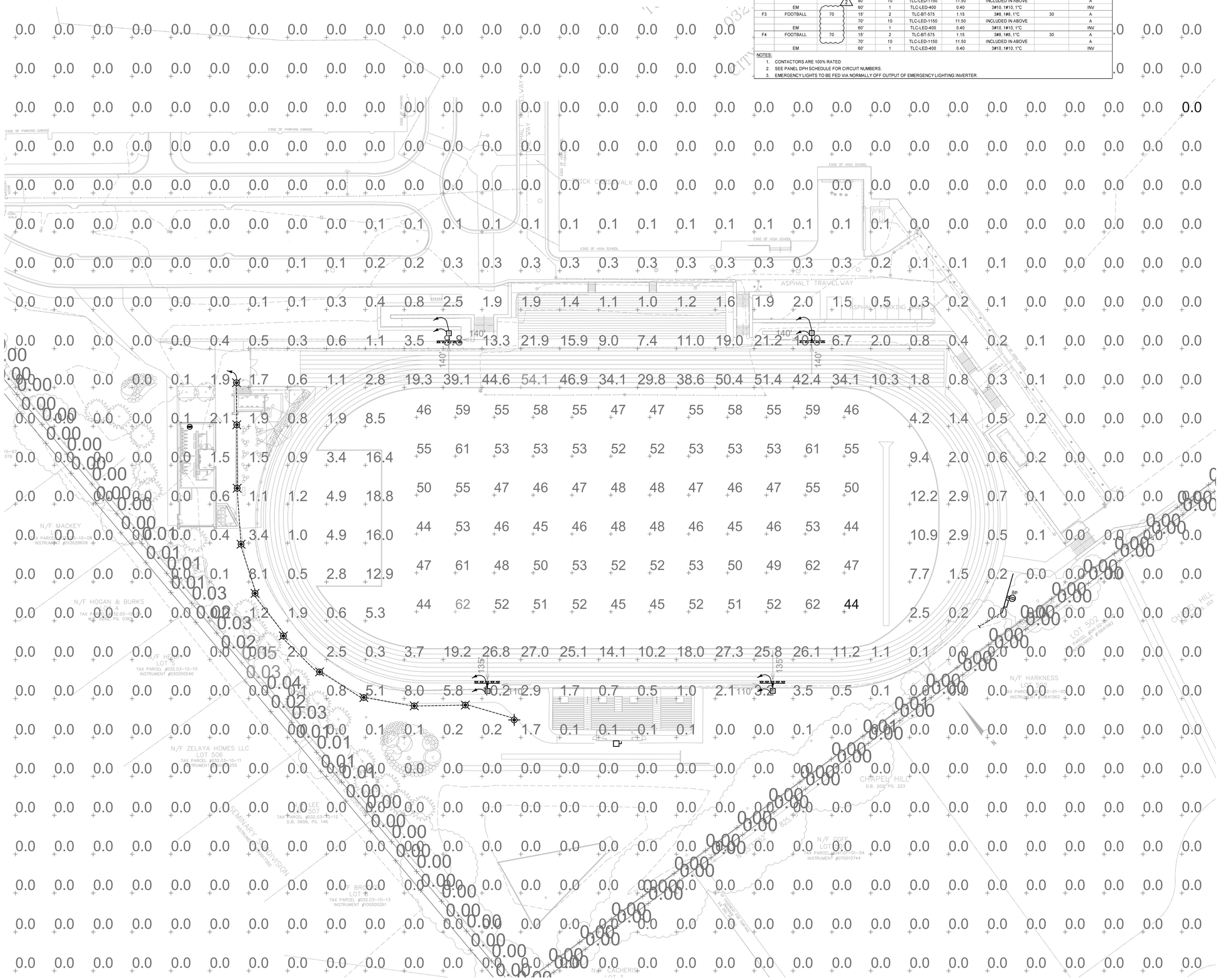
FOOTBALL SPORTS LIGHTING POLE SCHEDULE

POLE ID	CIRCUIT DESCRIPTION	POLE HEIGHT (FT)	FIXTURES MTG HT ABV FIELD	FIXTURES # OF FIXTURES	FIXTURES TYPE	LOAD (KW)	BRANCH CIRCUIT SIZE	CONTACTOR SIZE(A)	CIRCUIT
F1	FOOTBALL	80	15'	2	TLC-BT-575	1.15	3#8, 1#8, 1"C	30	A
			80'	10	TLC-LED-1150	11.50	INCLUDED IN ABOVE		A
	EM		60'	1	TLC-LED-400	0.40	3#10, 1#10, 1"C		INV
F2	FOOTBALL	80	15'	2	TLC-BT-575	1.15	3#8, 1#8, 1"C	30	A
			80'	10	TLC-LED-1150	11.50	INCLUDED IN ABOVE		A
	EM		60'	1	TLC-LED-400	0.40	3#10, 1#10, 1"C		INV
F3	FOOTBALL	70	15'	2	TLC-BT-575	1.15	3#8, 1#8, 1"C	30	A
			70'	10	TLC-LED-1150	11.50	INCLUDED IN ABOVE		A
	EM		60'	1	TLC-LED-400	0.40	3#10, 1#10, 1"C		INV
F4	FOOTBALL	70	15'	2	TLC-BT-575	1.15	3#8, 1#8, 1"C	30	A
			70'	10	TLC-LED-1150	11.50	INCLUDED IN ABOVE		A
	EM		60'	1	TLC-LED-400	0.40	3#10, 1#10, 1"C		INV

NOTES:
1. CONTACTORS ARE 100% RATED
2. SEE PANEL DPH SCHEDULE FOR CIRCUIT NUMBERS.
3. EMERGENCY LIGHTS TO BE FED VIA NORMALLY OFF OUTPUT OF EMERGENCY LIGHTING INVERTER.

KEY NOTES

1. SEE SHEET E0.01 FOR FIXTURE LOCATIONS, TYPES AND CIRCUITING.



1 E1.02 ATHLETIC PHOTOMETRICS PLAN
SCALE: 1" = 30'-0"
0 15' 30' 60'

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Project Number
216127.00
Date
2019.03.06
Scale
As Indicated
Drawing
ATHLETIC PHOTOMETRICS PLAN

E1.02

CONSTRUCTION DOCUMENTS

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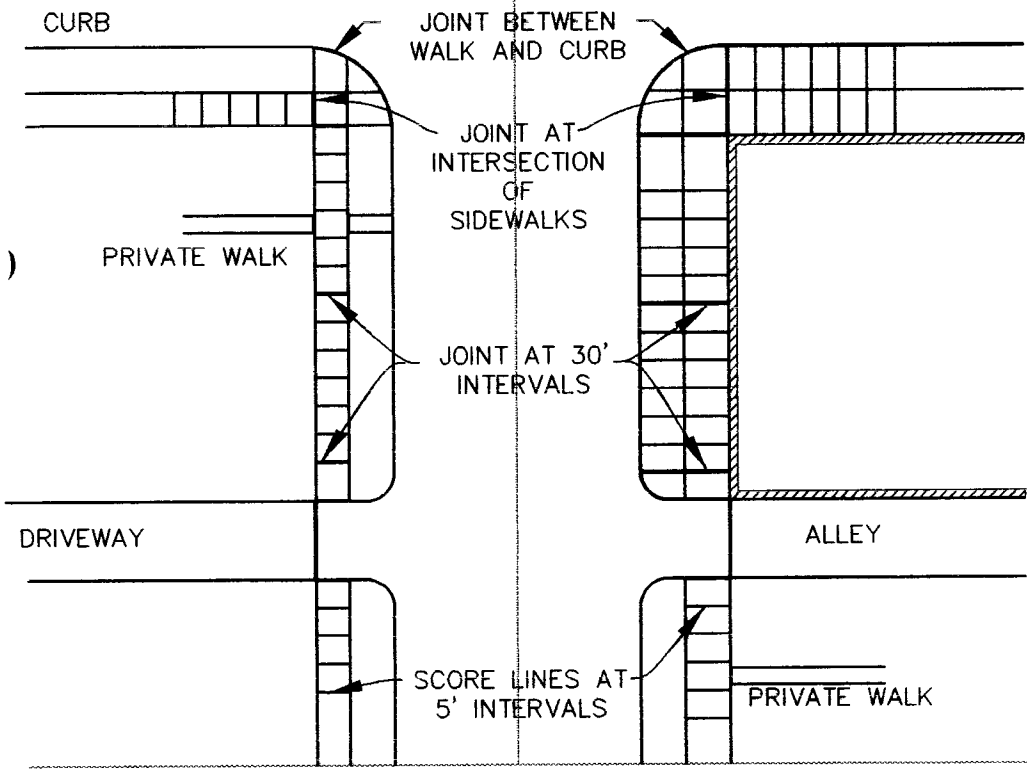
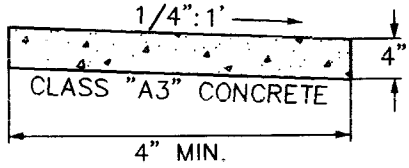


EXPANSION JOINT PLACEMENT



SIDEWALK SECTION

NOTES: 1.) JOINTS ARE OF 1/2" PRE MOLDED EXPANSION MATERIAL PRICE OF MATERIAL TO BE INCLUDED IN COST OF SIDEWALK.

2.) SLOPE OF GRASS AREAS WILL BE 1/2" PRE 1' MIN.

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT

ALEXANDRIA VIRGINIA

SIDEWALK

CSSW-1 | PAGE 29

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