

TO

PLANS AND SPECIFICATIONS

FOR CONSTRUCTION OF

NORTH GWINNETT HIGH SCHOOL

EAST ADDITION

FOR

GWINNETT COUNTY BOARD OF EDUCATION
GWINNETT COUNTY, GA

DATED: MARCH 1, 2021

SHL-D01-21

CUNNINGHAM FOREHAND MATTHEWS & MOORE, ARCHITECTS, INC.
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The following items shall take precedence over the plans and specifications (Project Manual) for the above named project and shall become a part of the Contract Documents.

Where any items called for in the specifications or indicated on the drawings are supplemented hereby, the original shall remain in effect.

Where any original item is amended, voided, or superseded hereby, the provisions of such item not specifically amended voided, or superseded shall remain in effect.

The following items shall be incorporated in the Plans and Project Manual.

A. PROJECT MANUAL:

ITEM NO. 1: SECTION 042000, UNIT MASONRY:

At PART 2 - PRODUCTS, MASONRY ACCESSORIES;, at "TotalFlash Cavity-wall Drainage System;..."

- a. Change "40" to "45"
- b. Change "Thermosplastic Vinyl" to "EPDM"

ITEM NO. 2: SECTION 059110, ALUMINUM DOOR CANOPIES:At PART 2 - PRODUCTS:

- a. At
- DOOR CANOPIES:
- , change paragraph to read:

"Shall be aluminum all extruded wall hung type canopy as Size as shown on the drawings. All sections shall be extruded aluminum alloy 6063 heat treated to maximum strength in T6 temper. The structure shall be designed to withstand walking on top, severe icing, heavy hail and hurricane winds. Finish of all sections shall be baked enamel finish. Color to match existing canopies at existing building. Provide flashing to match fascia color at walls. Underside of roof decking shall be baked enamel finish (color to match existing canopies at existing building)."

- b. At
- FINISH:
- , change paragraph to read:

"Finish shall be baked enamel finish for all columns, beams and top side of roof decking. Underside of roof decking shall be baked enamel finish. Colors to match existing canopies at existing building."

ITEM NO. 3: SECTION 087100, FINISH HARDWARE:

Replace section with revised section attached herein.

ITEM NO. 4: SECTION 100000, BUILDING SPECIALTIES:

At PART 2 - PRODUCTS AND INSTALLATION, TRACKS AND CURTAINS:,
Ceiling Channel Track (for Clinic Curtains):, change last paragraph to read:

"Approved; Assembly No. IFC-100 as manufactured by Imperial Privacy Systems."

B. DRAWINGS:ITEM NO. 1: DRAWING C2.00:

Replace drawing with revised drawing attached herein.

ITEM NO. 2: DRAWING C3.10:

Replace drawing with revised drawing attached herein.

ITEM NO. 3: DRAWING C3.20:

Replace drawing with revised drawing attached herein.

ITEM NO. 4: DRAWING C4.10:

Replace drawing with revised drawing attached herein.

ITEM NO. 5: DRAWING C4.20:

Replace drawing with revised drawing attached herein.

ITEM NO. 6: DRAWING C4.30:

Replace drawing with revised drawing attached herein.

ITEM NO. 7: DRAWING C4.45:

Replace drawing with revised drawing attached herein.

ITEM NO. 8: DRAWING C4.46:

Replace drawing with revised drawing attached herein.

ITEM NO. 9: DRAWING A2.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 10: DRAWING A2.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 11: DRAWING A2.7:

Replace drawing with revised drawing attached herein.

ITEM NO. 12: DRAWING E2.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 13: DRAWING E2.5:

Replace drawing with revised drawing attached herein.

ITEM NO. 14: DRAWING E4.2:

Replace drawing with revised drawing attached herein.

C. PRODUCT AND/OR MANUFACTURER APPROVAL:

ITEM NO. 1: The following manufacturers/products, complying with specifications, are acceptable for this project.

<u>SPECIFICATIONS</u>	<u>PRODUCT</u>	<u>MANUFACTURER</u>
059110	Aluminum Door Canopies	Tennessee Valley Metals
095100	Acoustical Ceilings (Acoustical Panels)	AVL Systems

End of Addendum No. 4

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Other doors to the extent indicated.

- B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.

- C. Related Sections:

1. Division 08 Section "Hollow Metal Doors and Frames".
2. Division 08 Section "Flush Wood Doors".
3. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
4. Division ~~28~~ 27 Section "Access Control".

- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
 - 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Wiring instructions for each electronic component scheduled herein.
 - 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
 - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
 2. Plans for existing and future key system expansion.
 3. Requirements for key control storage and software.
 4. Installation of permanent keys, cylinder cores and software.
 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Five years for exit hardware.
 - 2. Twenty five years for manual overhead door closer bodies.
 - 3. Five years for motorized electric latch retraction exit devices.
 - 4. Two years for electromechanical door hardware, unless noted otherwise.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

- a. ~~Two Hinges: For doors with heights up to 60 inches.~~
- b. Three Hinges: For doors with heights 61 to 90 inches.
- c. Four Hinges: For doors with heights 91 to 120 inches. ~~For doors with width greater than 36 inches.~~
- d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

- a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
- b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

- a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
- b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

- a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

- a. ~~McKinney Products; (MK).~~
- b. Stanley Hardware (ST).

- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

- a. Pemko Products; (PE).
- b. No Substitution.

2.3 POWER SUPPLY

A. Power supplies shall be provided with the following:

1. Power supplies and distribution shall be UL listed.
2. Dual voltage 12 or 24 VDC field selectable continuous output.
3. Tolerates brownout or overvoltage input $\pm 15\%$ of nominal voltage.
4. Thermal shutdown protection against overcurrent and reverse battery faults.
5. Integrated battery charging circuit prevents overvoltage on locking devices.
6. Lifetime replacement, no fault warranty.

B. Specification Data:

1. Power supply outputs are Class 2 power limited when used with 4, 8 or 16 output distribution boards.
2. Expandable up to 16 independently controlled power limited outputs.
3. LED indicators and form "C" contacts for supervision.
4. Supports up to two (2) sealed gel, AGM or wet lead acid batteries.
5. Dimensions: 14" x 14" x 4-3/4" enclosure.
6. Operating Temp: -4 to +122F [-20 to +50C].

C. Manufacturers:

1. Securitron Model: AQDI

2.4 POWER TRANSFER DEVICES

A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets with a 1-year warranty. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

- a. McKinney Products; (MK) - QC (# wires) Option.
- b. No Substitution.

B. Electrified Quick Connect Continuous Geared Transfer Hinges: Provide electrified transfer continuous geared hinges with a removable service panel cutout accessible without de-mounting door from the frame. Furnish with Molex™ standardized plug connectors with sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:
 - a. Pemko Products; (PE) - SER-QC (# wires) Option.
 - b. No Substitution.

C. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:
 - a. McKinney Products; (MK) - Electrical Connecting Kit: QC-R001.
 - b. McKinney Products; (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - QC-C Series.
 - b. No Substitution.

2.5 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:
 - a. Door Controls International (DC).
 - b. Rockwood Products; (RO).

B. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

3. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; (RO).

2.6 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
 1. Manufacturers:
 - a. Schlage (SC) Match Existing
 - b. No Substitution.
- C. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 1. Threaded mortise cylinders with rings and cams to suit hardware application.
 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 4. Tubular deadlocks and other auxiliary locks.
 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 6. Keyway: Manufacturer's Standard.Match Facility Standard.
- D. Keying System: Each type of lock and cylinders to be factory keyed.
 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:
 1. Change Keys per Cylinder: Two (2)
 2. Master Keys (per Master Key Level/Group): Five (5).
 3. Construction Keys (where required): Ten (10).
- F. Construction Keying: Provide construction master keyed cylinders.
- G. Key Registration List (Bitting List):
 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.7 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.
1. Locks shall meet or exceed the requirements of ANSI/BHMA A156.2 Series 4000, Grade 1 with all standard trims, as follows:
 - a. Cycle Test: ANSI/BHMA A156.2 Grade 1 requirements with no lever sag.
 - b. Abusive Locked Lever Torque: Exceed 3,100 in-lb with no entry; lock to maintain egress functionality in compliance with BHMA certification requirements.
 - c. Offset Lever Pull: Exceed 1,600 lbs with no entry (8 times ANSI/BHMA A156.2 requirements).
 - d. Latch Retraction with Preload: Exceed 100 lb preload while maintaining ANSI/BHMA requirements for operation in warped doors (2 times ANSI/BHMA A156.2 requirements).
 2. Vertical Impact: Exceed 100 vertical impacts (20 times ANSI/BHMA A156.2 requirements).
 3. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
 4. Locks are to be non-handed and fully field reversible.
 5. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.2 requirements to 9 million cycles.
 6. Manufacturers:
 - a. Sargent Manufacturing (SA) - 10X Line.
 - b. No Substitution.

2.8 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 2. Strikes for Bored Locks and Latches: BHMA A156.2.

3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.9 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
 7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 9. Extended cycle test: Devices to have been cycle tested 50 million cycles.
 10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 80 Series.
 - b. No Substitution.

C. Conventional Push Rail Exit Devices (Light Commercial Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Formed steel mounting rail construction, with steel or plastic covers, designed for economical commercial applications. Devices available for both rim and surface vertical rod applications.

1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 20 Series.

2.10 ELECTROMECHANICAL EXIT DEVICES

A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.

1. Energy Efficient Design: Provide devices which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
2. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.
3. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
4. Manufacturers:
 - a. Sargent Manufacturing (SA) - 80 Series.
 - b. No Substitution.

2.11 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Manufacturers:
 - a. Norton Door Controls (NO) - 7500 Series.
 - b. Sargent Manufacturing (SA) - 351 Series.
 - c. Yale Commercial(YA) - 4400 Series.

2.12 SURFACE MOUNTED CLOSER HOLDERS

- A. Electromagnetic Door Holders: Certified ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate 12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.
1. Manufacturers:
 - a. Rixson (RF) - 980/990 Series.
 - b. Sargent Manufacturing (SA) - 1560 Series.

2.13 ARCHITECTURAL TRIM

- A. Door Protective Trim
1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than

1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.14 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
 1. Manufacturers:
 - a. Rixson Door Controls (RF).
 - b. Sargent Manufacturing (SA).

2.15 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
 - 2. Reese Enterprises, Inc. (RE).

2.16 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.17 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
 - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. OT - Other
3. PE - Pemko
4. RO - Rockwood
5. SA - SARGENT
6. YA - Yale
7. RF - Rixson
8. SU - Securitron
9. HD - HID

HARDWARE SCHEDULE

Door #	Hdw Set	New Hdw Set
101	2.0	1.0
102	1.0	2.0
103	3.0	
104	3.0	
105	4.0	
106	3.0	
107	3.0	
108	8.0	
109	9.0	
110	8.0	
111	10.0	
111A	8.0	
112	13.0	11.0
113	13.0	11.0
114	19.0	
115	19.0	
116	13.0	11.0
117	10.0	
118	13.0	11.0
119	13.0	11.0
120	13.0	11.0
121	13.0	11.0
122	13.0	11.0
123	21.0	
124	21.0	
125	13.0	11.0
126	21.0	
127	13.0	11.0
128	13.0	11.0
129	21.0	
130	13.0	11.0
131	13.0	11.0
132	21.0	
133	21.0	

Door #	Hdw Set	New Hdw Set
134	13.0	11.0
135	13.0	11.0
136	21.0	
137	10.0	
138	13.0	11.0
139	7.0	
140	20.0	
141	12.0	
142	22.0	
143	22.0	
144	12.0	
145	15.0	
146	15.0	
201	10.0	
202	14.0	
203	14.0	
204	14.0	
205	13.0	
206	13.0	
207	13.0	11.0
208	13.0	11.0
209	20.0	
210	20.0	
211	18.0	
212	18.0	
213	16.0	
214	16.0	
215	14.0	
216	14.0	
217	14.0	
218	14.0	
219	13.0	
220	13.0	
221	14.0	

Door #	Hdw Set	New Hdw Set
222	13.0	11.0
223	13.0	11.0
224	5.0	
225	11.0	
226	17.0	
227	20.0	
228	6.0	
229	13.0	11.0
230	13.0	
231	11.0	
232	19.0	
233	19.0	
234	21.0	
235	20.0	
236	21.0	
237	21.0	
238	13.0	11.0
239	10.0	
301	8.0	
302	8.0	
E01	27.0	
E02	27.0	
E03	27.0	
E04	26.0	
E05	27.0	
E06	25.0	
T01	24.0	
T02	23.0	
T03	23.0	

Hardware Sets

Set: 1.0

Doors: 101 402

Description: Exterior Aluminum Card Access Exit Pair

2 Continuous Hinge	CFM__HD1 x Door Height		PE
2 Continuous Hinge	CFM__HD1 SER12 x Door Height		PE
1 Mullion	L980A	US28	SA
1 Rim Exit Device, Dummy	16 21 8810 FLW	US32D	SA
1 Rim Exit Device, Storeroom	21 55 56 8804 FLW GMK	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	TB 351 CPS 581-2	EN	SA
2 Door Stop (floor)	467-RKW	Black	RO
2 Wall Stop (bollard mtd)	400	US26D	RO
1 Threshold	171AK x Opening Width		PE
1 Mullion Gasketing	5110BL		PE
2 Sweep	315CN x Door Width		PE
1 ElectroLynx Harness	QC-C012		MK
1 ElectroLynx Harness	QC-C2500P		MK
1 Position Switch	DPS-M-GY by Div 27 Subcontractor		SU
1 Mullion Card Reader	SE RP10 by Div 27 Subcontractor	Blk	HD
1 Power Supply	AQD1		SU

Notes: Perimeter gasket by frame manufacturer.

Video / Intercom system by others.

Furnish door stops as required for bollard or floor mounting.

Door contact switch indicates propped door condition.

Access control panel and security software by security contractor.

Prep door and hinge jamb for electromechanical device.

OPERATION: Card reader outside temporarily retracts latchbolt - auto relock.

Device is fail-secure with inside RX switch and outside key override. Inside pushbar always allows egress.

Set: 2.0

Doors: 101 402

Description: Exterior Aluminum Nightlatch Function Exit Pair

2	Continuous Hinge	CFM__HD1 x Door Height		PE
2	Continuous Hinge	CFM__HD1 SER12 x Door Height		PE
1	Mullion	L980A	US28	SA
1	Rim Exit Device, Storeroom	16 21 8804 FLW GMK	US32D	SA
1	Rim Exit Device, Dummy	16 21 8810 FLW	US32D	SA
1	Mullion Cylinder	21 980C1 GMK	US26D	SA
2	Surface Closer	TB 351 CPS 581-2	EN	SA
2	Door Stop (floor)	467-RKW	Black	RO
2	Wall Stop (bollard mtd)	400	US26D	RO
1	Threshold	171AK x Opening Width		PE
1	Mullion Gasketing	5110BL		PE
2	Sweep	315CN x Door Width		PE
1	Position Switch	DPS-M-GY by Div 27 Subcontractor		SU

Notes: Perimeter gasket by frame manufacturer.
Furnish door stops as required for bollard or floor mounting.
Door contact switch indicates propped door condition.

Set: 3.0

Doors: 103, 104, 106, 107

Description: Exterior Card Access Exit Pair

5 Hinge, Full Mortise, Hvy Wt	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK
1 Hinge, Full Mortise, Hvy Wt	T4A3386 QC12 4-1/2" x 4-1/2"	US32D	MK
1 Mullion	L980S	PC	SA
1 Rim Exit Device, Dummy	16 21 8810 FLW	US32D	SA
1 Rim Exit Device, Storeroom	21 55 56 8804 FLW GMK	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	351 CPS	EN	SA
2 Door Stop (floor) @107	467-RKW	Black	RO
2 Wall Stop (bollard mtd) @103, 104, 106	400	US26D	RO
1 Threshold	171AK x Opening Width		PE
1 Mullion Gasketing	5110BL		PE
1 Perimeter Gasketing	2891AS x Head & Jambs		PE
2 Sweep	315CN x Door Width		PE
1 ElectroLynx Harness	QC-C012		MK
1 ElectroLynx Harness	QC-C2500P		MK
2 Position Switch	DPS-M-GY by Div 28 Subcontractor		SU
1 Mullion Card Reader	SE-RP10 by Div 28 Subcontractor	Blk	HD
1 Power Supply	AQD as Required by Div 28 Sub		SU
1 Future Access Control	prep and run wire for future access control		OT

Notes: ~~Door contact switch indicates propped door condition.~~

Furnish door stops as required for bollard or floor mounting.

~~Access control panel and security software by security contractor.~~

Prep door and hinge jamb for electromechanical device.

~~OPERATION: Card reader outside temporarily retracts latchbolt— auto relock.~~

~~Device is fail-secure with inside RX switch and outside key override. Inside pushbar always allows egress.~~

Floor stop @ 107

Wall stop @ 103, 104, 106

Set: 4.0

Doors: 105

Description: Exterior Aluminum Nightlatch Function Exit Pair

5 Hinge, Full Mortise, Hvy Wt	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK
1 Hinge, Full Mortise, Hvy Wt	T4A3386 QC12 4-1/2" x 4-1/2"	US32D	MK
1 Mullion	L980S	PC	SA
1 Rim Exit Device, Storeroom	16 21 8804 FLW GMK	US32D	SA
1 Rim Exit Device, Dummy	16 21 8810 FLW	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	351 CPS	EN	SA
2 Door Stop (floor)	467-RKW	Black	RO
2 Wall Stop (bollard mtd)	400	US26D	RO
1 Threshold	171AK x Opening Width		PE
1 Mullion Gasketing	5110BL		PE
1 Perimeter Gasketing	2891AS x Head & Jambs		PE
2 Sweep	315CN x Door Width		PE
2 Position Switch	DPS-M-GY by Div 27 Subcontractor		SU

Notes: Door contact switch indicates propped door condition.
Furnish door stops as required for bollard or floor mounting.

Set: 5.0

Doors: 224

Description: Classroom Function Exit - Smoke Door

3 Hinge, Full Mortise, Hvy Wt	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Rim Exit Device, Classroom	LD 21 8813 ETL GMK	US32D	SA
1 Surface Closer	TB 351 P10	EN	SA
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
4 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE

Set: 6.0

Doors: 228

Description: Classroom Function Exit Pair - Smoke Door

6 Hinge, Full Mortise, Hvy Wt	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Mullion	L980S	PC	SA
1 Rim Exit Device, Classroom	LD 21 8813 ETL GMK	US32D	SA
1 Rim Exit Device, Exit Only	LD 8810 EO	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	TB 351 P10	EN	SA
2 Kick Plate	K1050 10" High	US32D	RO
2 Wall Stop	406	US32D	RO
1 Mullion Gasketing	5110BL		PE
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE

Set: 7.0

Doors: 139

Description: Classroom Function Exit Pair + Sound Seals

6 Hinge, Full Mortise, Hvy Wt	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Mullion	L980S	PC	SA
1 Rim Exit Device, Classroom	LD 21 8813 ETL GMK	US32D	SA
1 Rim Exit Device, Exit Only	LD 8810 EO	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	TB 351 P10	EN	SA
2 Kick Plate	K1050 10" High	US32D	RO
2 Wall Stop	406	US32D	RO
1 Mullion Gasketing	5110BL		PE
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE
2 Door Bottom	4301CNBL		PE

Set: 8.0

Doors: 108, 110, 111A, 301, 302

Description: Rated Classroom Function Exit Pair + Magnetic Wall Holder

6 Hinge, Full Mortise, Hvy Wt	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Surface Vert Rod Exit, Exit Only	12 NB8710 EO	US32D	SA
1 Surface Vert Rod Exit, Classroom	12 21 NB8713 ETL GMK	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	TB 351 O	EN	SA
2 Kick Plate	K1050 10" High	US32D	RO
2 Electromagnetic Holder	998M	689	RF
1 Mullion Gasketing	5110BL 120"		PE
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Astragal - Set	18061CNB		PE

Notes: Wall magnets are tied to fire alarm system & release at smoke activation.

Set: 9.0

Doors: 109

Description: Rated Classroom Function Exit Pair

6 Hinge, Full Mortise, Hvy Wt	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Mullion	12-L980	PC	SA
1 Rim Exit Device, Exit Only	12 8810 EO	US32D	SA
1 Rim Exit Device, Classroom	12 21 8813 ETL GMK	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	TB 351 P10	EN	SA
2 Kick Plate	K1050 10" High	US32D	RO
2 Wall Stop	406	US32D	RO
1 Mullion Gasketing	5110BL		PE
1 Smoke Gasketing	S88BL x Head & Jambs		PE

Notes:

Set: 10.0

Doors: 111, 117, 137, 201, 239

Description: Rated Passage Function Exit Pair + Magnetic Wall Holders

6 Hinge, Full Mortise, Hvy Wt	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Surface Vert Rod Exit, Passage	12 NB8715 ETL	US32D	SA
1 Surface Vert Rod Exit, Exit Only	12 NB8710 EO	US32D	SA
2 Surface Closer	TB 351 O	EN	SA
2 Kick Plate	K1050 10" High	US32D	RO
2 Electromagnetic Holder	998M	689	RF
1 Mullion Gasketing	5110BL		PE
1 Smoke Gasketing	S88BL x Head & Jambs		PE

Notes: Wall magnets are tied to fire alarm system & release at smoke activation.

Set: 11.0

Doors: 112, 113, 116, 118, 119, 120, 121, 122, 125, 127, 128, 130, 131, 134, 135, 138, 207, 208, 222, 223, 225, 229, 231, 238

Description: Classroom Function

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lock	21 10XG37 LL GMK	US26D	SA
1 Wall Stop	406	US32D	RO
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE

Set: 12.0

Doors: 141, 144

Description: Classroom Function + Sound Seals

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lock	21 10XG37 LL GMK	US26D	SA
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Door Bottom	4301CNBL 36"		PE
1 Acoustic Seal Set	PEMKOSTCSET-1A - SAR	BL	PE

Set: 13.0

Doors: 112, 113, 116, 118, 119, 120, 121, 122, 125, 127, 128, 130, 131, 134, 135, 138, 205, 206, 207, 208, 219, 220, 222, 223, 229, 230, 238

Description: Classroom Function + Closer

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lock	21 10XG37 LL GMK	US26D	SA
1 Surface Closer	TB 351 O	EN	SA
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
3 Silencer	608-RKW		RO

Notes: Furnish perimeter gaskets in lieu of silencers at fire and smoke rated openings.

Set: 14.0

Doors: 202, 203, 204, 215, 216, 217, 218, 221

Description: Rated Classroom Function + Closer

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lock	21 10XG37 LL GMK	US26D	SA
1 Surface Closer	TB 351 P10	EN	SA
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE

Set: 15.0

Doors: 145, 146

Description: Passage Function + Sound Seals

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Passage Latch	10XU15 LL	US26D	SA
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Door Bottom	4301CNBL		PE

Set: 16.0

Doors: 213, 214

Description: Privacy Function

3 Hinge, Full Mortise	TA2314 NRP 4-1/2" x 4-1/2"	US32D	MK
1 Privacy Lock	10XU65 LL	US26D	SA
1 Mop Plate	K1050 6" High	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Coat Hook	796	US26D	RO

Set: 17.0

Doors: 226

Description: Privacy Function + Closer

3 Hinge, Full Mortise	TA2314 NRP 4-1/2" x 4-1/2"	US32D	MK
1 Privacy Lock	10XU65 LL	US26D	SA
1 Surface Closer	TB 351 O	EN	SA
1 Mop Plate	K1050 6" High	US32D	RO
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Coat Hook	796	US26D	RO

Set: 18.0

Doors: 211, 212

Description: Push Plate & Pull + Closer

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Push Plate	70F	US32D	RO
1 Pull Plate	111x70C TB	US32D	RO
1 Surface Closer	TB 351 O	EN	SA
1 Mop Plate	K1050 6" High	US32D	RO
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608-RKW		RO

Set: 19.0

Doors: 114, 115, 232, 233

Description: Staff Toilet

3 Hinge, Full Mortise	TA2314 NRP 4-1/2" x 4-1/2"	US32D	MK
1 Deadbolt + Indicator	D292	626	YA
1 Entry/Office Lock	21 10XG05 LL GMK	US26D	SA
1 Surface Closer	TB 351 O	EN	SA
1 Mop Plate	K1050 6" High	US32D	RO
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE
1 Coat Hook	796	US26D	RO

Notes: Verify function with local AHJ. - Dual motion for exit requires approval.

Set: 20.0

Doors: 140, 209, 210, 227, 235

Description: Storeroom Function

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom/Closet Lock	21 10XG04 LL GMK	US26D	SA
1 Wall Stop	406	US32D	RO
3 Silencer	608-RKW		RO

Set: 21.0

Doors: 123, 124, 126, 129, 132, 133, 136, 234, 236, 237

Description: Rated Storeroom Function + Closer

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom/Closet Lock	21 10XG04 LL GMK	US26D	SA
1 Surface Closer	TB 351 O	EN	SA
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE

Set: 22.0

Doors: 142, 143

Description: Storeroom Function Pair

6 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Flush Bolt	555	US26D	RO
1 Dust Proof Strike	570	US26D	RO
1 Storeroom/Closet Lock	21 10XG04 LL GMK	US26D	SA
2 Surf Overhead Hold Open	9-326	689	RF
1 Astragal	357SS x Door Height		PE
2 Silencer	608-RKW		RO

Set: 23.0

Doors: T02, T03

Description: Temporary Gate

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Rim Exit Device, Classroom	LD 21 8813 ETL GMK	US32D	SA
1 Surface Closer	351 P10	EN	SA
1 Wall Stop	406	US32D	RO
3 Silencer	608-RKW		RO
1 Rim Exit Device, Exit Only	2828 EO	EN	SA
1 Rim Cylinder	21 34 GMK	US15	SA
1 Gate Closer & Hinge	Tiger 180-Degree x Puma Hinge	9005	OT
3 Gate hardware	By Gate Mfg		OT

Notes: Hinges & utility pull by gate manufacturer.

Set: 24.0

Doors: T01

Description: Temporary Exit Pair

6 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Mullion	L980S	PC	SA
1 Rim Exit Device, Classroom	LD 21 8813 ETL GMK	US32D	SA
1 Rim Exit Device, Exit Only	LD 8810 EO	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	351 P10	EN	SA
2 Wall Stop	406	US32D	RO
2 Silencer	608-RKW		RO

Set: 25.0

Doors: E06

Description: Existing Opening - Demo Door and Hardware

1 Demo	Remove door and hardware	OT
3 Filler Plate	DFF4	RO
1 Filler Plate	SFASA	RO

Notes: Existing frame to remain.
Install cover plates. Confirm compatibility.

Set: 26.0

Doors: E04

Description: Demo Opening

1 Demo Opening	Remove All Existing Opening Components	OT
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Set: 27.0

Doors: E01, E02, E03, E05

Description: Existing to Remain

1 Salvage Demo Hardware	Re-install hardware as required.	OT
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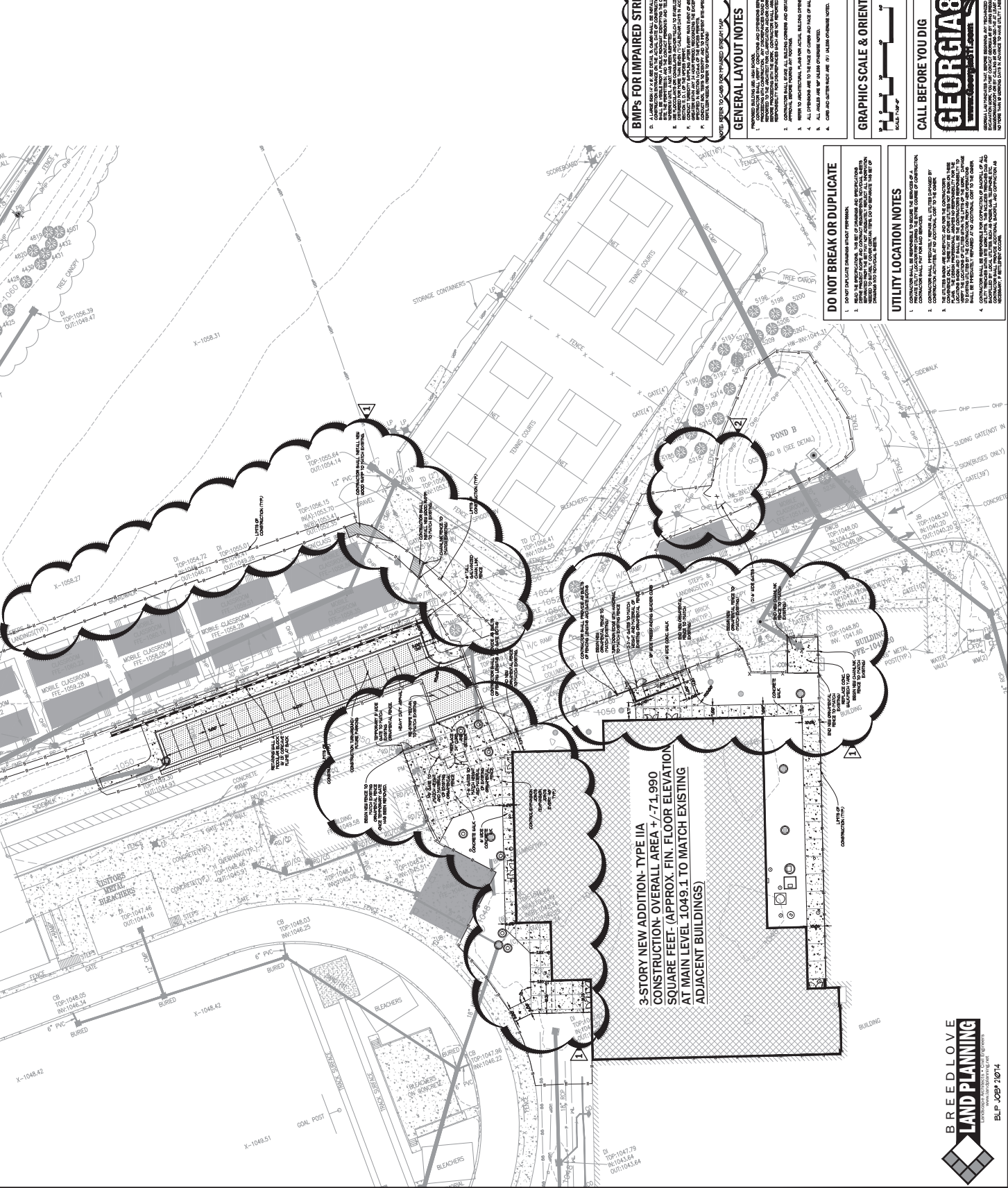
Notes: Existing doors and frame to remain.

END OF SECTION 087100

DRAWING ISSUE RECORD

NO.	DATE	REVISION
1	04/11/17	ISSUED FOR PERMITS
2	04/11/17	ISSUED FOR PERMITS
3	04/11/17	ISSUED FOR PERMITS
4	04/11/17	ISSUED FOR PERMITS
5	04/11/17	ISSUED FOR PERMITS
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8	04/11/17	ISSUED FOR PERMITS
9	04/11/17	ISSUED FOR PERMITS
10	04/11/17	ISSUED FOR PERMITS

SITE LAYOUT & PAVING PLAN



BMPs FOR IMPAIRED STREAM

- CONSTRUCT BMPs TO PREVENT EROSION AND SEDIMENTATION FROM ENTERING THE STREAM.
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GENERAL LAYOUT NOTES

- PROVIDE SLOPES FOR ALL PAVEMENT AND CONCRETE SURFACES.
- CONSTRUCT CURBS AND GUTTERS AS SHOWN.
- CONSTRUCT SIDEWALKS AND BIKEWAYS AS SHOWN.
- CONSTRUCT DRIVEWAYS AND PATHWAYS AS SHOWN.
- CONSTRUCT UTILITY LINES AS SHOWN.
- CONSTRUCT FENCES AND BARRIERS AS SHOWN.
- CONSTRUCT LIGHTING FIXTURES AS SHOWN.
- CONSTRUCT SIGNAGE AND MARKINGS AS SHOWN.
- CONSTRUCT LANDSCAPING AND PLANTING AS SHOWN.
- CONSTRUCT EROSION CONTROL MEASURES AS SHOWN.

GRAPHIC SCALE & ORIENTATION

SCALE: 1" = 20'-0"

CALL BEFORE YOU DIG

GEORGIA811
TOLL FREE 1-800-4-A-ROOTS

- DO NOT BREAK OR DUPLICATE**
- DO NOT BREAK OR DUPLICATE THESE DRAWINGS.
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- UTILITY LOCATION NOTES**
- CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE THE SERVICES OF ALL UTILITIES PRIOR TO CONSTRUCTION.
 - CONTRACTOR SHALL CALL 811 PRIOR TO CONSTRUCTION.
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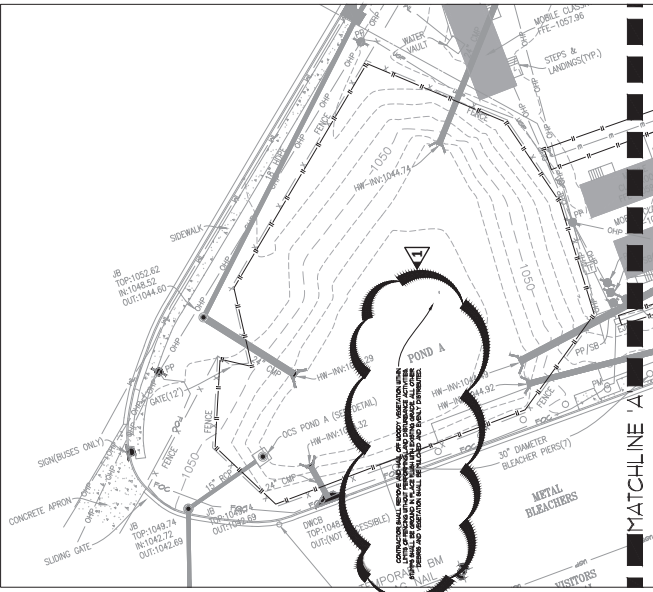
**3-STORY NEW ADDITION- TYPE IIA
CONSTRUCTION- OVERALL AREA +/- 71,990
SQUARE FEET- APPROX. FIN. FLOOR ELEVATION
AT MAIN LEVEL 1049.1 TO MATCH EXISTING
ADJACENT BUILDINGS**



GEORGIA811
 CALL BEFORE YOU DIG
 1-800-4-A-SHIELD

GRAPHIC SCALE & ORIENTATION
 SCALE: 1"=40'-0"
 NORTH

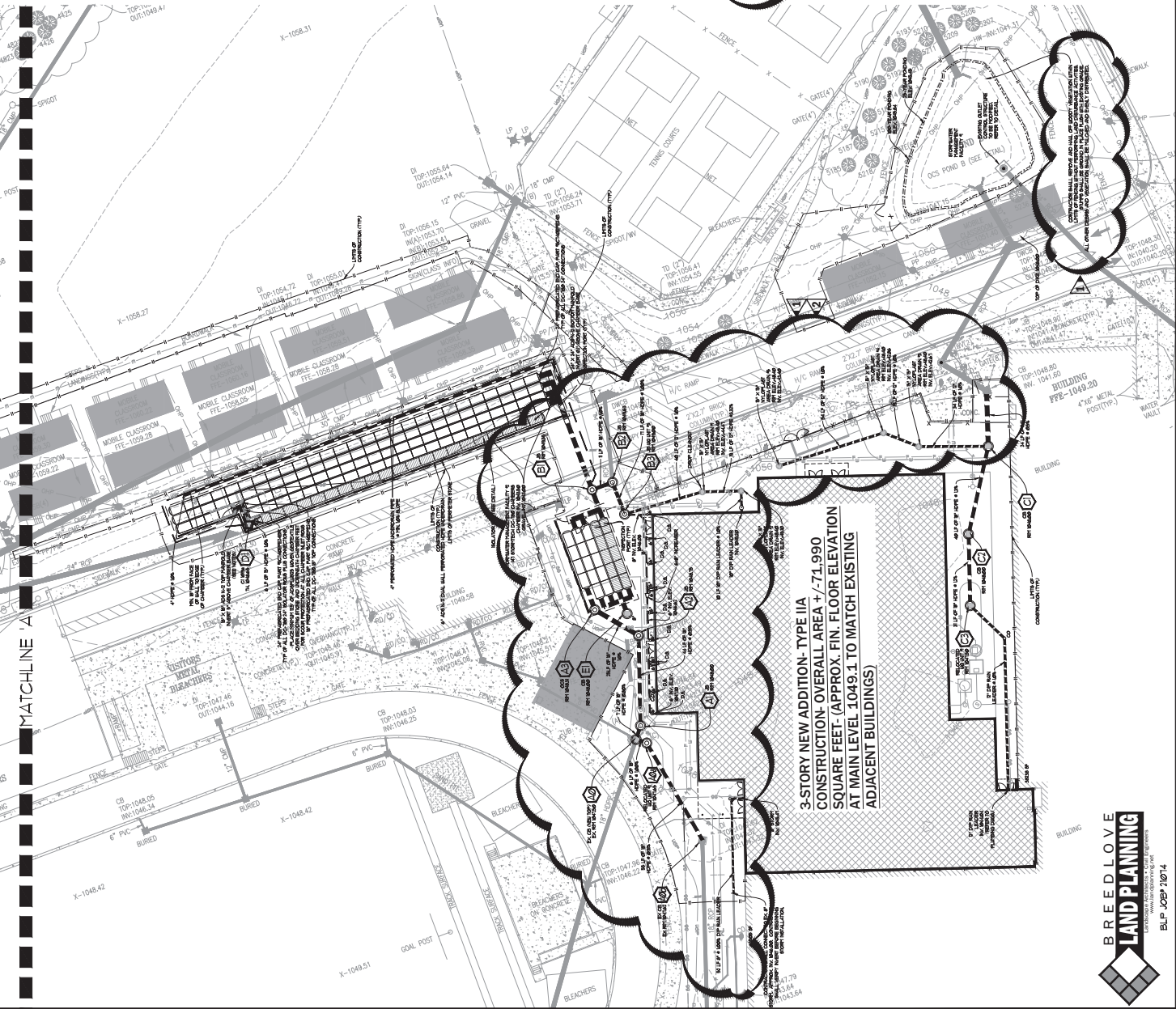
DO NOT BREAK OR DUPLICATE
 1. DO NOT DUPLICATE OR REPRODUCE THIS DRAWING WITHOUT THE WRITTEN PERMISSION OF THE ARCHITECT.
 2. THIS DRAWING IS THE PROPERTY OF THE ARCHITECT AND IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREIN.
 3. ANY REVISIONS TO THIS DRAWING SHALL BE MADE BY THE ARCHITECT AND SHALL BE IDENTIFIED BY A REVISION CIRCLE AND NUMBER.
 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.
 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXISTING CONDITIONS AND UTILITIES SHOWN ON THIS DRAWING.
 6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES AND STRUCTURES TO REMAIN.
 7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ACCESS TO ALL ADJACENT PROPERTIES AND PUBLIC AREAS.
 8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ALL AREAS DAMAGED DURING CONSTRUCTION TO ORIGINAL OR BETTER CONDITION.
 9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY INSURANCE COVERAGE.
 10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY BONDS.



STORM DRAINAGE PLAN

NO.	DATE	REVISION
1	08/11/2014	ISSUE FOR PERMITS
2	08/11/2014	ISSUE FOR PERMITS
3	08/11/2014	ISSUE FOR PERMITS
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100	08/11/2014	ISSUE FOR PERMITS

BMPs FOR IMPAIRED STREAM
 1. ALL BMPs SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE BEST MANAGEMENT PRACTICES (BMPs) FOR IMPAIRED STREAMS (BMP-IS) AS REQUIRED BY THE STATE OF GEORGIA AND THE U.S. ENVIRONMENTAL PROTECTION AGENCY (USEPA).
 2. THE BMPs SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE BMP-IS MANUAL, WHICH IS AVAILABLE AT THE FOLLOWING WEBSITE: <http://www.ecp.com/bmp-manual>.
 3. THE BMPs SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE BMP-IS MANUAL, WHICH IS AVAILABLE AT THE FOLLOWING WEBSITE: <http://www.ecp.com/bmp-manual>.
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 10. THE BMPs SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE BMP-IS MANUAL, WHICH IS AVAILABLE AT THE FOLLOWING WEBSITE: <http://www.ecp.com/bmp-manual>.
 NOTE: REFER TO CASE FOR IMPAIRED STREAM MAP



NO.	DATE	REVISION
1		ISSUED FOR PERMIT
2		REVISED PER COMMENTS
3		REVISED PER COMMENTS
4		REVISED PER COMMENTS
5		REVISED PER COMMENTS
6		REVISED PER COMMENTS
7		REVISED PER COMMENTS
8		REVISED PER COMMENTS
9		REVISED PER COMMENTS
10		REVISED PER COMMENTS

STORM PIPE PROFILES & WALL ELEVATION

ADDITIONS AND ALTERATIONS TO:
 NORTH GWINNETT HIGH SCHOOL
 20 LEVEL CREEK RD NW
 SUWANEE, GA 30084
 FOR GWINNETT COUNTY, GEORGIA

cunningham forhand mcfarlane moore
 architects, inc. - atlanta, georgia 30324 - phone (404) 873-2152

C3.20



BMPs FOR IMPAIRED STREAM

1. ALL BMPs SHALL BE DESIGNED, CONSTRUCTED, MAINTAINED, AND MONITORED IN ACCORDANCE WITH THE BEST MANAGEMENT PRACTICES (BMPs) FOR IMPAIRED STREAMS AS SET FORTH IN THE ATTACHED ATTACHMENT.
2. BMPs SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE ATTACHED ATTACHMENT.
3. BMPs SHALL BE MAINTAINED AND MONITORED IN ACCORDANCE WITH THE ATTACHED ATTACHMENT.
4. BMPs SHALL BE MAINTAINED AND MONITORED IN ACCORDANCE WITH THE ATTACHED ATTACHMENT.
5. BMPs SHALL BE MAINTAINED AND MONITORED IN ACCORDANCE WITH THE ATTACHED ATTACHMENT.

DO NOT BREAK OR DUPLICATE

1. THE CONTRACTOR SHALL BE RESPONSIBLE TO SECURE THE SERVICES OF A REGISTERED PROFESSIONAL ENGINEER TO REVIEW AND SEAL ALL DRAWINGS AND SPECIFICATIONS BEFORE THE COMMENCEMENT OF CONSTRUCTION.

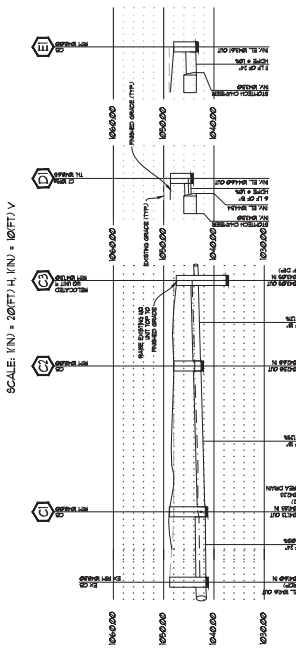
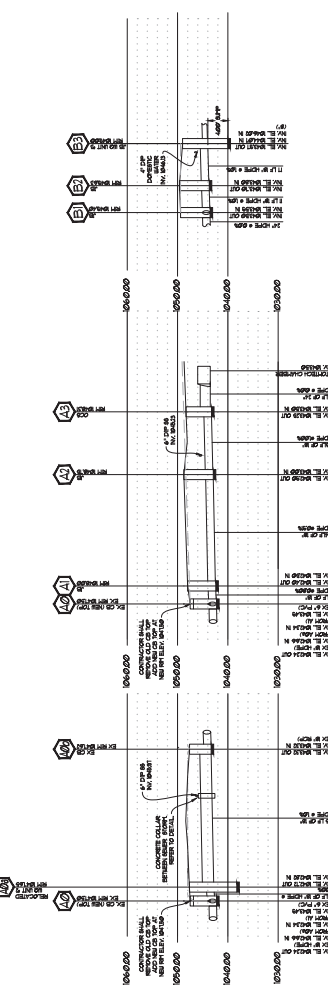


CALL BEFORE YOU DIG
GEORGIA811
 1-800-4-A-DIG

UTILITY LOCATION NOTES

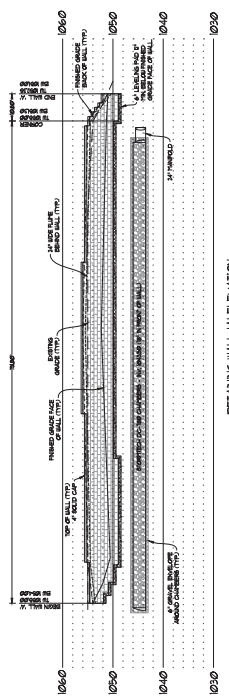
1. CONTRACTOR SHALL BE RESPONSIBLE TO SECURE THE SERVICES OF A REGISTERED PROFESSIONAL ENGINEER TO REVIEW AND SEAL ALL DRAWINGS AND SPECIFICATIONS BEFORE THE COMMENCEMENT OF CONSTRUCTION.
2. CONTRACTOR SHALL CALL 811 FOR ALL UTILITIES.
3. THE UTILITIES SHOWN ARE BASED ON THE RECORD DRAWINGS AND FIELD SURVEY DATA. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
4. CONTRACTOR SHALL BE RESPONSIBLE TO SECURE THE SERVICES OF A REGISTERED PROFESSIONAL ENGINEER TO REVIEW AND SEAL ALL DRAWINGS AND SPECIFICATIONS BEFORE THE COMMENCEMENT OF CONSTRUCTION.

STORM PIPE PROFILES



SCALE: (N) = 20'(F) H, (N) = 10'(F) V

SCALE: (N) = 20'(F) H, (N) = 10'(F) V



RETAINING WALL 'A' ELEVATION
 MODULAR BLOCK
 SCALE: 1"=10' V
 1"=20' H

BREEDLOVE LAND PLANNING
 REGISTERED PROFESSIONAL ENGINEER
 STATE OF GEORGIA
 BLP JOB # 10714

DATE	REVISION	NO.

INITIAL ES&PC PLAN

ADDITIONS AND ALTERATIONS TO
NORTH GUNNETT HIGH SCHOOL
20 LEBEL CREEK RD NW
GAINESVILLE, GA 30604
FOR GUNNETT COUNTY, GEORGIA
REVISED 11/2020
SHEET NO. 107
JOB NO. 1974

cumingham forhand and mckee more
cunningham, forhand & more, architects, inc. - 2017 manchester street, n.e. - atlanta, georgia 30324 - phone (404) 873-2152

C4.10



BMPs FOR IMPAIRED STREAM

1. A LAMINAR FLOW BARRIER (LFB) SHALL BE INSTALLED AT EACH POINT OF ENTRY TO THE STREAM FROM THE DISTURBED AREA.
2. THE LAMINAR FLOW BARRIER SHALL BE CONSTRUCTED OF 2" X 4" TIMBER OR 2" POLYPROPYLENE PIPE, WITH 1/2" SAND OR GRAVEL FILLING THE SPACE BETWEEN THE BARRIERS.
3. THE BARRIERS SHALL BE SPACED TO ALLOW WATER TO FLOW UNDER THEM AT A RATE OF 100 GPM PER LINEAL FOOT.
4. THE BARRIERS SHALL BE MAINTAINED AT ALL TIMES TO ENSURE PROPER FUNCTIONING.
5. THE BARRIERS SHALL BE REMOVED UPON COMPLETION OF CONSTRUCTION AND RESTORATION OF THE STREAM TO ORIGINAL OR BETTER CONDITION.
6. THE BARRIERS SHALL BE INSTALLED UPSTREAM OF ANY EXISTING OR PROPOSED STRUCTURES THAT MAY BE AFFECTED BY THE IMPAIRED STREAM.
7. THE BARRIERS SHALL BE INSTALLED UPSTREAM OF ANY EXISTING OR PROPOSED STRUCTURES THAT MAY BE AFFECTED BY THE IMPAIRED STREAM.
8. THE BARRIERS SHALL BE INSTALLED UPSTREAM OF ANY EXISTING OR PROPOSED STRUCTURES THAT MAY BE AFFECTED BY THE IMPAIRED STREAM.
9. THE BARRIERS SHALL BE INSTALLED UPSTREAM OF ANY EXISTING OR PROPOSED STRUCTURES THAT MAY BE AFFECTED BY THE IMPAIRED STREAM.
10. THE BARRIERS SHALL BE INSTALLED UPSTREAM OF ANY EXISTING OR PROPOSED STRUCTURES THAT MAY BE AFFECTED BY THE IMPAIRED STREAM.

DISTURBED AREA

AREA OF DISTURBANCE SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION.

HYDROSEEDING NOTE

ALL LAWNS SHALL BE HYDROSEEDED IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS:

- 1. HYDROSEEDING SHALL BE PERFORMED WITHIN 14 DAYS OF THE COMPLETION OF THE DISTURBED AREA.
- 2. THE HYDROSEEDING MIXTURE SHALL BE APPLIED AT A RATE OF 100 LBS PER 1000 SQ FT.
- 3. THE HYDROSEEDING MIXTURE SHALL BE APPLIED TO A MOIST SUBSTRATE.
- 4. THE HYDROSEEDING MIXTURE SHALL BE APPLIED TO A MOIST SUBSTRATE.
- 5. THE HYDROSEEDING MIXTURE SHALL BE APPLIED TO A MOIST SUBSTRATE.
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- 9. THE HYDROSEEDING MIXTURE SHALL BE APPLIED TO A MOIST SUBSTRATE.
- 10. THE HYDROSEEDING MIXTURE SHALL BE APPLIED TO A MOIST SUBSTRATE.

EROSION NARRATIVE

THE CONSTRUCTION SHALL INCLUDE EROSION CONTROL MEASURES TO PREVENT SOIL EROSION AND TO RESTORE THE DISTURBED AREA TO ORIGINAL OR BETTER CONDITION.

INITIAL EROSION INSPECTION

THE INITIAL EROSION INSPECTION SHALL BE CONDUCTED WITHIN 14 DAYS OF THE START OF CONSTRUCTION.

GSWCC LEVEL II CERTIFICATIONS

THE CONTRACTOR SHALL OBTAIN GSWCC LEVEL II CERTIFICATIONS FOR ALL PERSONNEL INVOLVED IN THE CONSTRUCTION.

24-HOUR ES&PC CONTACTS

THE CONTRACTOR SHALL MAINTAIN 24-HOUR CONTACT WITH THE ENGINEER DURING CONSTRUCTION.

GRAPHIC SCALE & ORIENTATION

SCALE: 1" = 40'-0"

CALL BEFORE YOU DIG

CALL 811 TO LOCATE UTILITIES BEFORE DIGGING.

CONSTRUCTION SCHEDULE

THE CONSTRUCTION SCHEDULE SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

GENERAL EROSION NOTES

1. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF CONSTRUCTION.

2. EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES.

3. EROSION CONTROL MEASURES SHALL BE REMOVED UPON COMPLETION OF CONSTRUCTION.

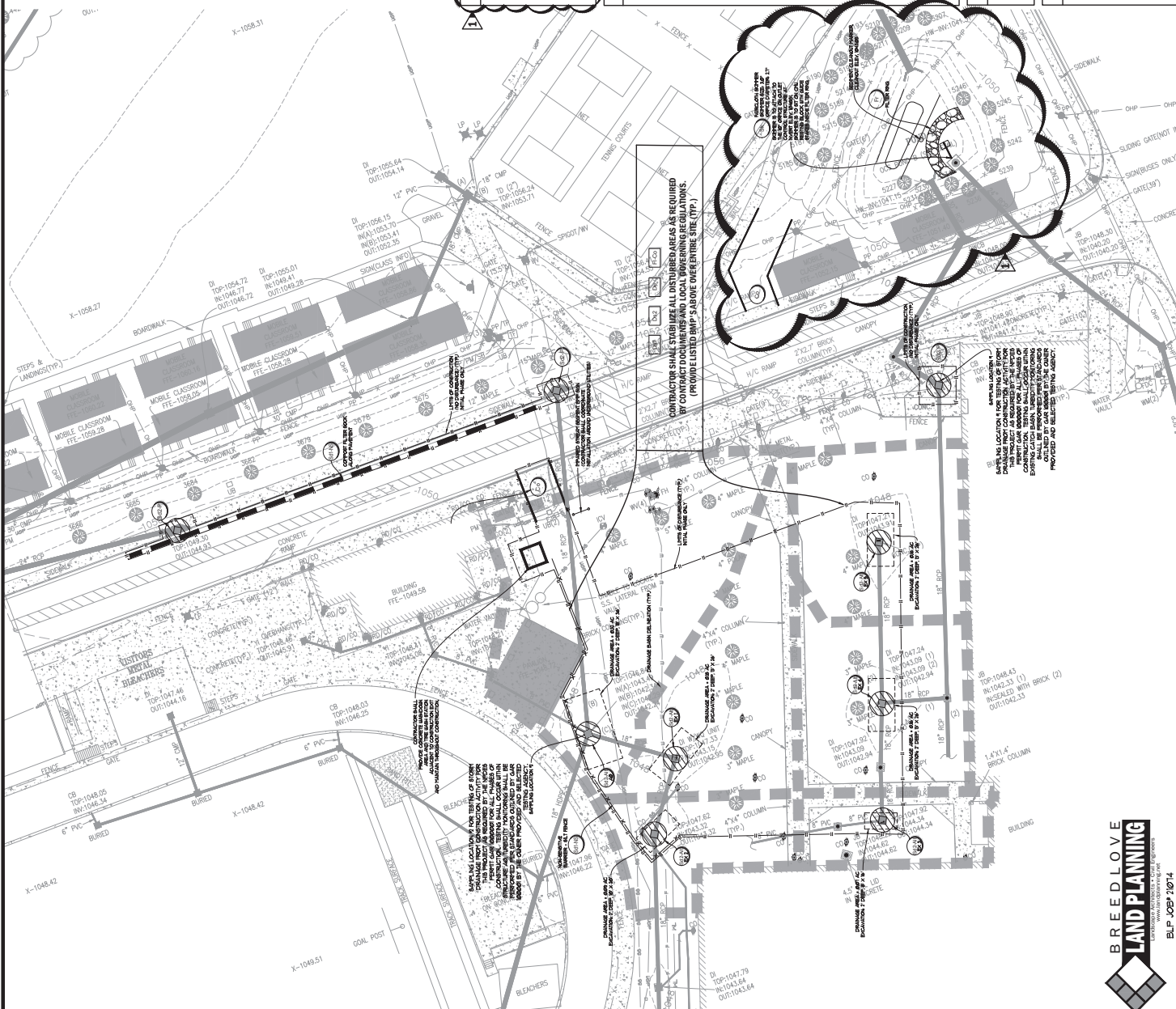
4. EROSION CONTROL MEASURES SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION.

DO NOT BREAK OR DUPLICATE

THE CONTRACTOR SHALL NOT BREAK OR DUPLICATE ANY OF THE EROSION CONTROL MEASURES.

UTILITY LOCATION NOTES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES PRIOR TO CONSTRUCTION.



CONTRACTOR SHALL OBTAIN ALL DISTURBED AREAS AS REQUIRED BY CONTACT DOCUMENTS AND LOCAL GOVERNING REGULATIONS. (PROVIDE LISTED BMP ABOVE OVERLAP SITE (TP-1))

APPROXIMATE LOCATION OF UTILITIES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES PRIOR TO CONSTRUCTION.



BLP JOB #1974



GEORGIA811
CALL BEFORE YOU DIG
1-800-4-A-GUARD
www.georgia811.com



24-HOUR ES&PC CONTACTS
CONTRACTOR: CUMMINGS, FORHAND & MORE ARCHITECTS, INC.
PROJECT: NORTH CREEK HIGH SCHOOL
PHONE NUMBER: 404-873-2152
FAX NUMBER: 404-873-2153
E-MAIL: greg@cfmarch.com

GSWCC LEVEL II CERTIFICATIONS
NOTE: THE EFFECTIVE DATE OF ANY GSWCC CERTIFICATION SHALL BE THE DATE OF THE ORIGINAL CERTIFICATION. ALL GSWCC CERTIFICATIONS SHALL BE VALID FOR ONE YEAR FROM THE DATE OF THE ORIGINAL CERTIFICATION. ALL GSWCC CERTIFICATIONS SHALL BE VALID FOR ONE YEAR FROM THE DATE OF THE ORIGINAL CERTIFICATION. ALL GSWCC CERTIFICATIONS SHALL BE VALID FOR ONE YEAR FROM THE DATE OF THE ORIGINAL CERTIFICATION.

HYDROSEEDING NOTE
ALL LAWNS SHALL BE HYDROSEEDED WITH A MIXTURE OF 50% BENTONITE AND 50% HYDROSEED. THE HYDROSEED SHALL BE APPLIED TO ALL LAWNS AT THE TIME OF THE FINAL GRASSING. THE HYDROSEED SHALL BE APPLIED TO ALL LAWNS AT THE TIME OF THE FINAL GRASSING. THE HYDROSEED SHALL BE APPLIED TO ALL LAWNS AT THE TIME OF THE FINAL GRASSING.

DISTURBED AREA
TOTAL DIST. AREA: 301 AC. DISTURBED AREA: 108 AC.

BMPs FOR IMPAIRED STREAM
D. CONSTRUCTION SHALL BE LIMITED TO THE DISTURBED AREA OF THE STREAM. CONSTRUCTION SHALL BE LIMITED TO THE DISTURBED AREA OF THE STREAM. CONSTRUCTION SHALL BE LIMITED TO THE DISTURBED AREA OF THE STREAM. CONSTRUCTION SHALL BE LIMITED TO THE DISTURBED AREA OF THE STREAM.

INTERMEDIATE EROSION SUMMARY
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ES&PC PLAN-INTERMEDIATE PLAN

Table with 2 columns: DATE, REVISION. Rows include: 08/11/10, 10% PLAN; 08/11/10, 30% PLAN; 08/11/10, 50% PLAN; 08/11/10, 70% PLAN; 08/11/10, 85% PLAN; 08/11/10, 90% PLAN; 08/11/10, 95% PLAN; 08/11/10, 100% PLAN.



UTILITY LOCATION NOTES
1. CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE THE SERVICES OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.

DO NOT BREAK OR DUPLICATE
DO NOT BREAK OR DUPLICATE THIS PLAN. DO NOT BREAK OR DUPLICATE THIS PLAN. DO NOT BREAK OR DUPLICATE THIS PLAN. DO NOT BREAK OR DUPLICATE THIS PLAN.

GENERAL EROSION NOTES
1. NOTIFY GSWCC IMMEDIATELY IN WRITING OF ANY EROSION CONTROL MEASURES THAT ARE REQUIRED TO BE INSTALLED PRIOR TO ANY GRASSING. NOTIFY GSWCC IMMEDIATELY IN WRITING OF ANY EROSION CONTROL MEASURES THAT ARE REQUIRED TO BE INSTALLED PRIOR TO ANY GRASSING.

CONSTRUCTION SCHEDULE
TABLE WITH 2 COLUMNS: NAME, START DATE. Rows include: MOBILE CLASSROOM, CONCRETE PUMP, etc.

CONTRACTOR SHALL STABILIZE ALL DISTURBED AREAS WITHIN 14 DAYS OF COMPLETION OF CONSTRUCTION. CONTRACTOR SHALL STABILIZE ALL DISTURBED AREAS WITHIN 14 DAYS OF COMPLETION OF CONSTRUCTION.

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DRAWING ISSUE RECORD

NO.	DATE	REVISION
1		ISSUE FOR PERMITS
2		ISSUE FOR BIDDING
3		ISSUE FOR CONSTRUCTION
4		ISSUE FOR FINAL
5		ISSUE FOR AS-BUILT
6		ISSUE FOR RECORD
7		ISSUE FOR ARCHIVE
8		ISSUE FOR LEGAL
9		ISSUE FOR OTHER
10		ISSUE FOR FINAL

ES&PC PLAN-FINAL PLAN

ADDITIONS AND ALTERATIONS TO
NORTH CREEK HIGH SCHOOL
20 LEVEL CREEK RD NW
GAINNETT COUNTY, GEORGIA
DATE: 04/09/19
SCALE: 1/8" = 1'-0"

ES&PC PLAN-FINAL PLAN

ADDITIONS AND ALTERATIONS TO
NORTH CREEK HIGH SCHOOL
20 LEVEL CREEK RD NW
GAINNETT COUNTY, GEORGIA
DATE: 04/09/19
SCALE: 1/8" = 1'-0"

BMPs FOR IMPAIRED STREAM

- LAUNCH AND ROLL ALTERNATIVE BMPs SHALL BE INSTALLED AT EACH IMPAIRED STREAM CROSSING TO PREVENT EROSION AND SEDIMENTATION FROM ENTERING THE STREAM. THE BMPs SHALL BE DESIGNED TO PREVENT EROSION AND SEDIMENTATION FROM ENTERING THE STREAM. THE BMPs SHALL BE DESIGNED TO PREVENT EROSION AND SEDIMENTATION FROM ENTERING THE STREAM.
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NOTE: REFER TO CAD FOR IMPAIRED STREAM PLAN

FINAL EROSION SUMMARY

CONTRACTOR SHALL MAINTAIN ALL EXISTING AND NEW EROSION CONTROL MEASURES THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD.

NOTE

PLANTING, INCLUDING TREES, SHRUBS, GROUNDCOVER, SOIL AND PERMANENT GRASSING (SEEDING) IS NOT IN CONTRACT. CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY GRASSING THROUGHOUT CONSTRUCTION. CONTRACTOR SHALL PREPARE ALL PLANTING BEDS, ISLANDS AND LAWN AREAS FOR PLANTING PER PROJECT SPECIFICATIONS.

DISTURBED AREA

TOTAL DIST. AREA	301 AC	DEFERRED AREA	108 AC
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HYDROSEEDING NOTE

ALL LAWN AREAS SHALL BE HYDROSEEDED WITH A MIXTURE OF 50% BENTONITE GRASS SEED AND 50% HYDROSEEDING MIXTURE. THE MIXTURE SHALL BE APPLIED AT A RATE OF 100 LBS PER 1000 SQ FT. THE MIXTURE SHALL BE APPLIED AT A RATE OF 100 LBS PER 1000 SQ FT. THE MIXTURE SHALL BE APPLIED AT A RATE OF 100 LBS PER 1000 SQ FT.

GSWC LEVEL II CERTIFICATIONS

CONTRACTOR SHALL MAINTAIN ALL EXISTING AND NEW EROSION CONTROL MEASURES THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD.

24-HOUR ES&PC CONTACTS

CONTRACTOR SHALL MAINTAIN ALL EXISTING AND NEW EROSION CONTROL MEASURES THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD.

GRAPHIC SCALE & ORIENTATION

SCALE: 1/8" = 1'-0"

CALL BEFORE YOU DIG

GEORGIA811

CALL BEFORE YOU DIG

CONSTRUCTION SCHEDULE

CONTRACTOR SHALL MAINTAIN ALL EXISTING AND NEW EROSION CONTROL MEASURES THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD.

PERMANENT STABILIZATION LEGEND

CONTRACTOR SHALL MAINTAIN ALL EXISTING AND NEW EROSION CONTROL MEASURES THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND MAINTENANCE PERIOD.

GENERAL EROSION NOTES

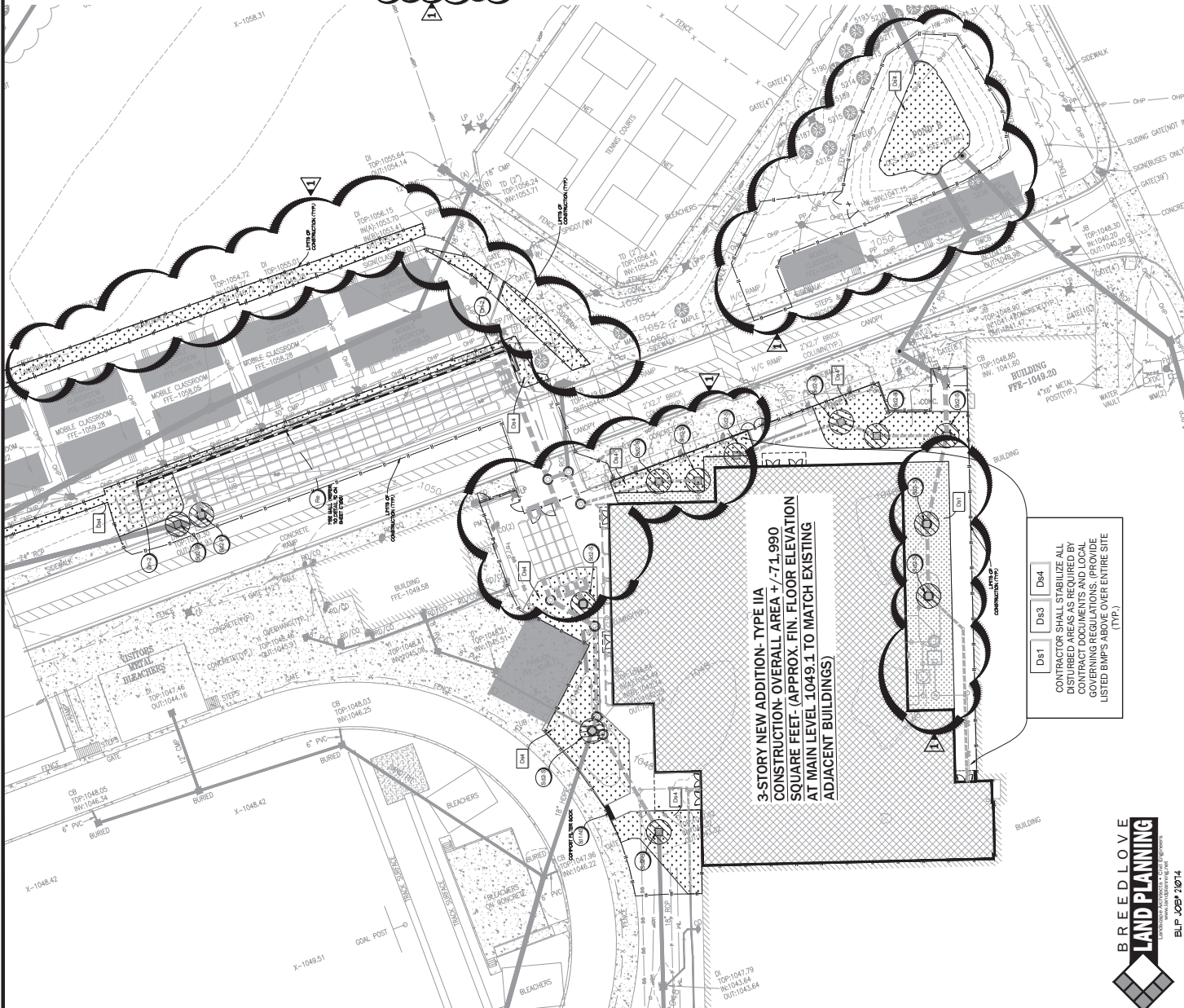
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DO NOT BREAK OR DUPLICATE

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UTILITY LOCATION NOTES

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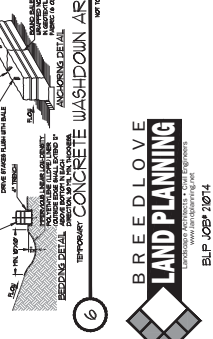
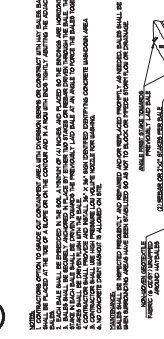
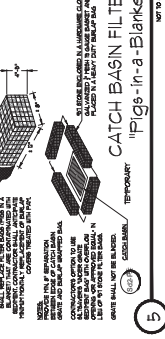
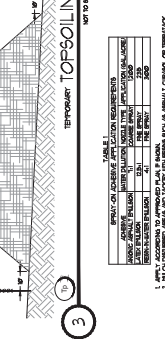
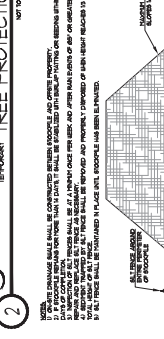
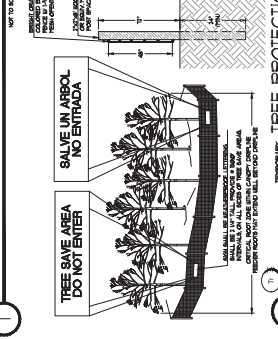
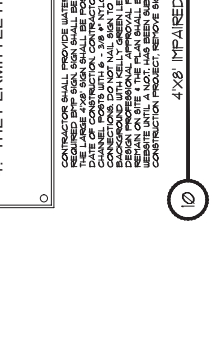
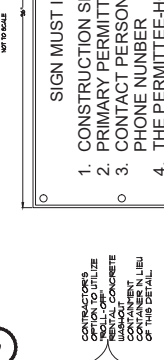
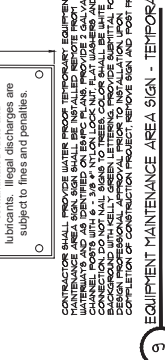
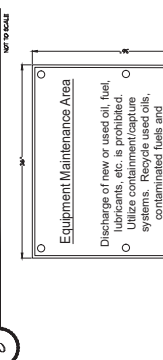
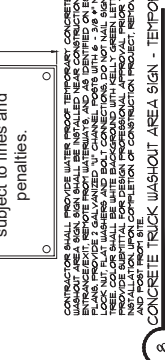
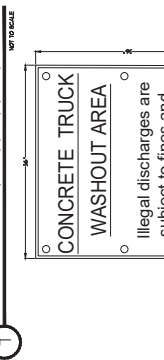
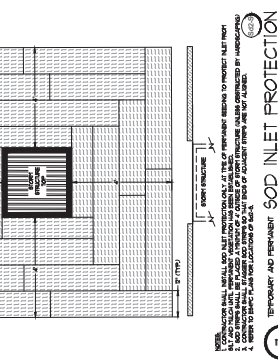
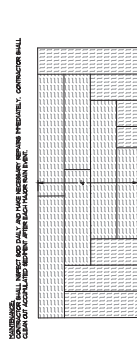
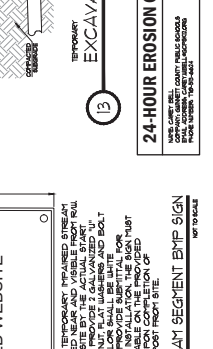
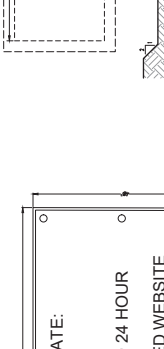
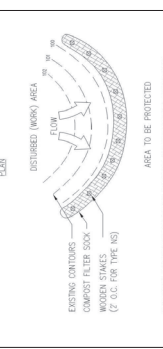
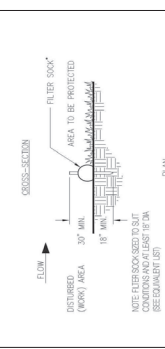
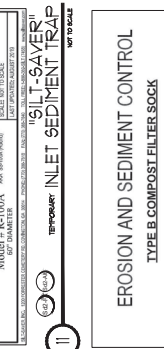
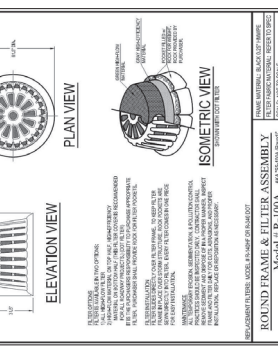
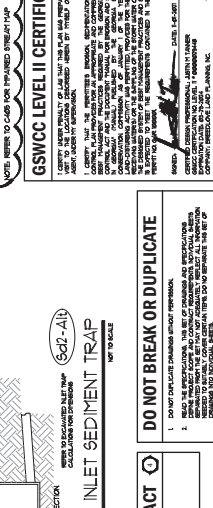
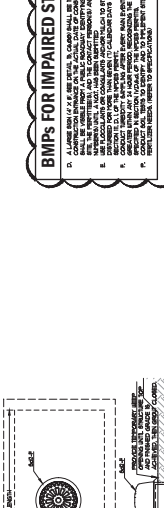
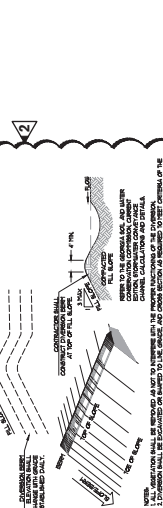
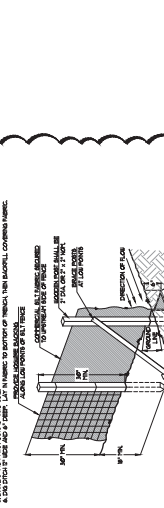
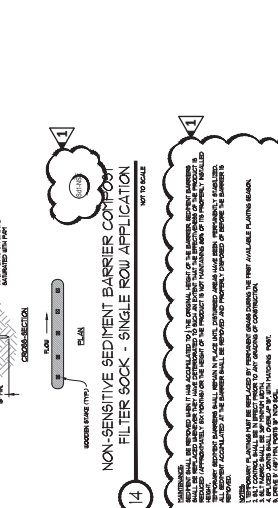


DATE	REVISION	NO.
10/20/2017	ISSUE FOR PERMIT	1
10/20/2017	ISSUE FOR PERMIT	2
10/20/2017	ISSUE FOR PERMIT	3
10/20/2017	ISSUE FOR PERMIT	4

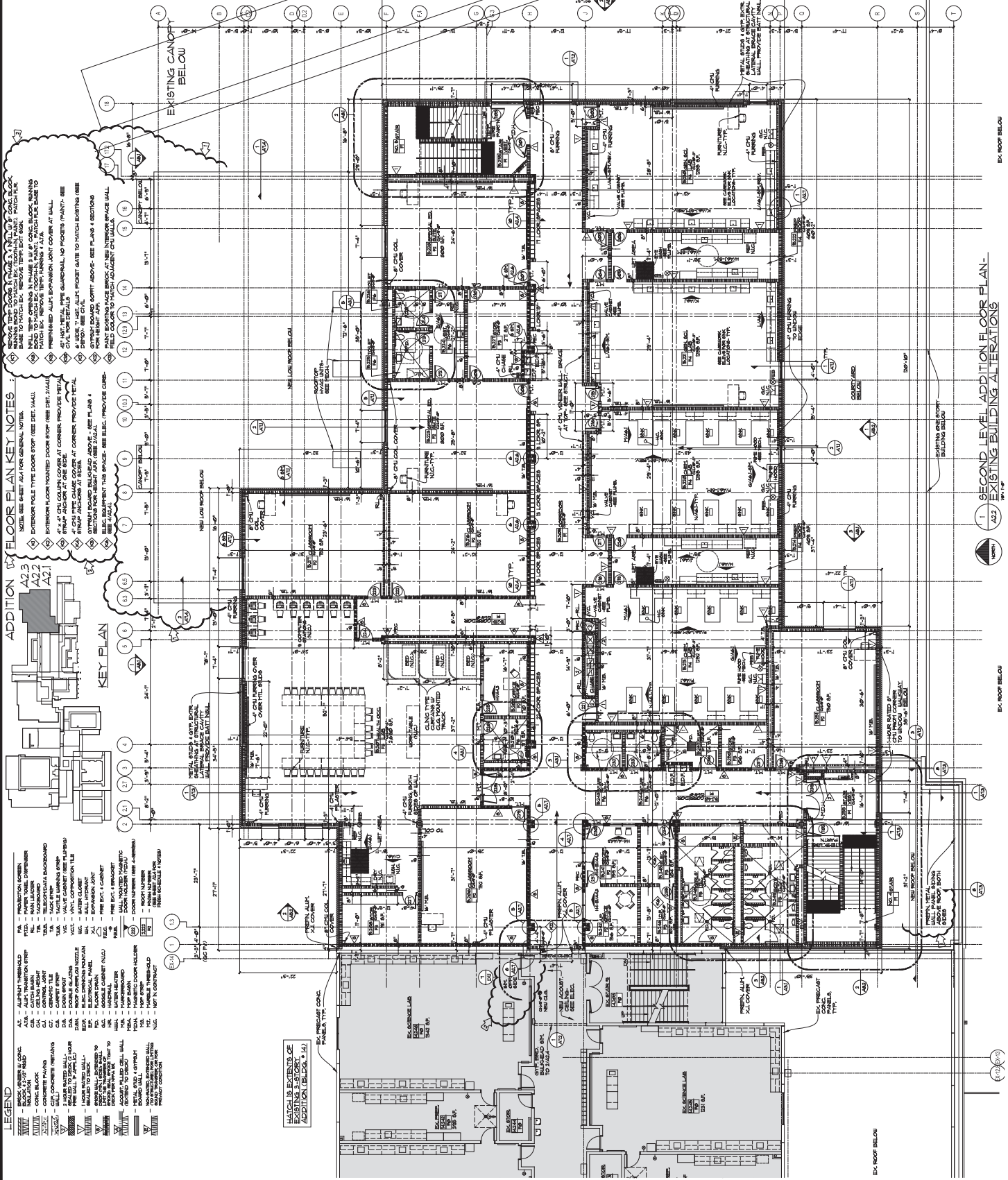
ADDITIONS AND ALTERATIONS TO
NORTH GWINNETT HIGH SCHOOL
220 GUNNETH DRIVE
GWINNETT, GEORGIA 30228
FOR GWINNETT COUNTY SCHOOLS
GWINNETT COUNTY, GEORGIA

ES&PC DETAILS

DRAWING	ISSUE	RECORD
10/20/2017	ISSUE FOR PERMIT	1
10/20/2017	ISSUE FOR PERMIT	2
10/20/2017	ISSUE FOR PERMIT	3
10/20/2017	ISSUE FOR PERMIT	4



NO.	REVISION
1	ISSUE
2	20% PERMIT SET
3	30% PERMIT SET
4	40% PERMIT SET
5	50% PERMIT SET
6	60% PERMIT SET
7	70% PERMIT SET
8	80% PERMIT SET
9	90% PERMIT SET
10	AS BUILT



ADDITION FLOOR PLAN KEY NOTES :

NOTE: SEE SHEET A2 FOR GENERAL NOTES.

1. EXTERIOR FLOOR FINISH SHALL BE CONCRETE TO MATCH EXISTING. NEW EXTERIOR WALLS SHALL BE 8" CMU BLOCK WITH 1/2" GYPSUM BOARD AND FINISH TO MATCH EXISTING. NEW EXTERIOR WALLS SHALL BE 8" CMU BLOCK WITH 1/2" GYPSUM BOARD AND FINISH TO MATCH EXISTING.

2. ALL INTERIOR WALLS SHALL BE 5/8" GYPSUM BOARD OVER 2x4 STUDS.

3. ALL INTERIOR WALLS SHALL BE 5/8" GYPSUM BOARD OVER 2x4 STUDS.

4. ALL INTERIOR WALLS SHALL BE 5/8" GYPSUM BOARD OVER 2x4 STUDS.

5. ALL INTERIOR WALLS SHALL BE 5/8" GYPSUM BOARD OVER 2x4 STUDS.

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25. ALL INTERIOR WALLS SHALL BE 5/8" GYPSUM BOARD OVER 2x4 STUDS.

26. ALL INTERIOR WALLS SHALL BE 5/8" GYPSUM BOARD OVER 2x4 STUDS.

27. ALL INTERIOR WALLS SHALL BE 5/8" GYPSUM BOARD OVER 2x4 STUDS.

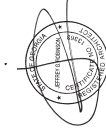
LEGEND

AL	ALUMINUM OVERHEAD DOOR
AS	ASBESTOS
BA	BASEBOARD
CB	CONCRETE BLOCK
CC	CONCRETE
CD	CONCRETE DIAPHRAGM WALL
CE	CONCRETE
CF	CONCRETE FLOOR
CG	CONCRETE FINISH
CH	CONCRETE
CI	CONCRETE
CJ	CONCRETE
CK	CONCRETE
CL	CONCRETE
CM	CONCRETE
CN	CONCRETE
CO	CONCRETE
CP	CONCRETE
CQ	CONCRETE
CR	CONCRETE
CS	CONCRETE
CT	CONCRETE
CU	CONCRETE
CV	CONCRETE
CW	CONCRETE
CX	CONCRETE
CY	CONCRETE
CZ	CONCRETE
DA	DOOR
DB	DOOR
DC	DOOR
DD	DOOR
DE	DOOR
DF	DOOR
DG	DOOR
DH	DOOR
DI	DOOR
DJ	DOOR
DK	DOOR
DL	DOOR
DM	DOOR
DN	DOOR
DO	DOOR
DP	DOOR
DQ	DOOR
DR	DOOR
DS	DOOR
DT	DOOR
DU	DOOR
DV	DOOR
DW	DOOR
DX	DOOR
DY	DOOR
DZ	DOOR

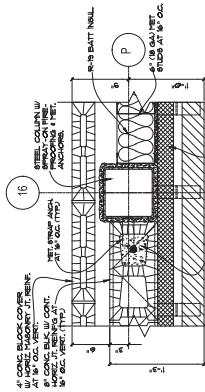
1. SECOND LEVEL ADDITION FLOOR PLAN - EXISTING BUILDING ALTERATIONS

Curryam Ford and Matthews
 Cunningham, Forehand, Matthews & Moore, Architects, Inc. - 2011 Manchester Street, N.E. - Atlanta, Georgia 30324 - Phone (404) 873-2152

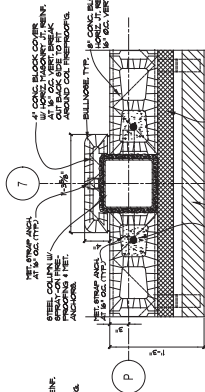
North Gwinnett High School
 East Addition
 20 Level Creek Road, Suwanee, GA 30024
 Gwinnett County Board of Education
 Gwinnett County, Georgia
 Facility Code 667-4596



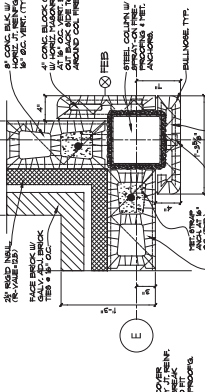
1 COLUMN PLAN
 A2.7 / DETAIL
 1/8" = 1'-0"



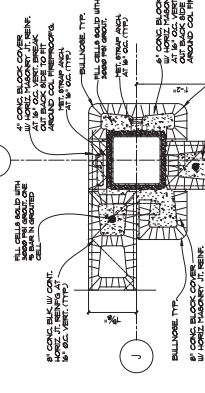
2 COLUMN PLAN
 A2.7 / DETAIL
 1/8" = 1'-0"



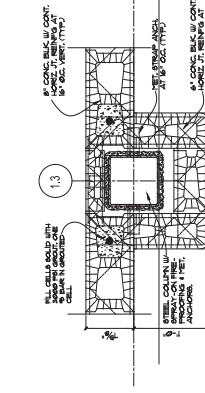
3 COLUMN PLAN
 A2.7 / DETAIL
 1/8" = 1'-0"



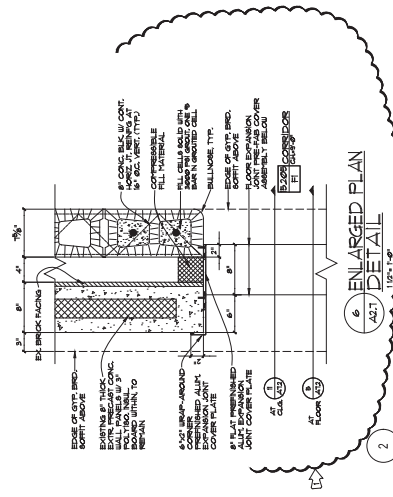
4 COLUMN PLAN
 A2.7 / DETAIL
 1/8" = 1'-0"



5 COLUMN PLAN
 A2.7 / DETAIL
 1/8" = 1'-0"



6 ENLARGED PLAN
 A2.7 / DETAIL
 1/8" = 1'-0"



DATE	REVISION	NO.
12/02/21	BLANK PERMIT SET	1
10/22/21	DATE FINAL APPROVED	1
05/22/21	ADDITION NO. 1	1

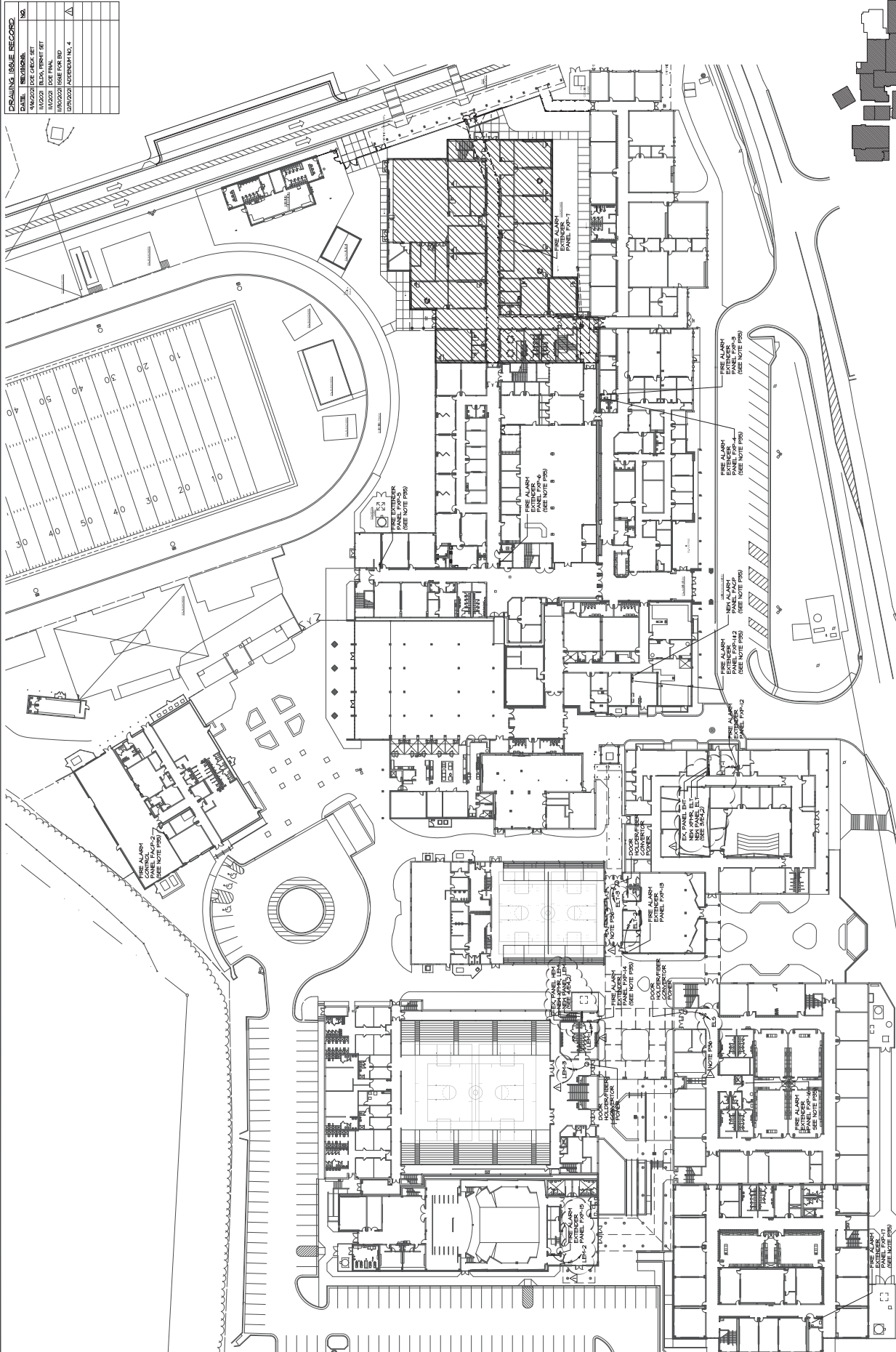
SPURLOCK & ASSOCIATES, INC.
consulting engineers, pc
1370 OAKRIDGE, GA 30135
P: 404.433.8474 F: 404.433.1716
www.spurlock.com

PROFESSIONAL ENGINEER
STATE OF GEORGIA
No. 10009



SEE SHEET E2.1 FOR REFERENCED POWER NOTES.

MAIN LEVEL FLOOR PLAN - POWER



DRAWING ISSUE RECORD

DATE	REVISION	NO.
08/14/12	ISSUE FOR PERMIT SET	1
08/14/12	ISSUE FOR PERMIT SET	2
08/14/12	ISSUE FOR PERMIT SET	3
08/14/12	ISSUE FOR PERMIT SET	4
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08/14/12	ISSUE FOR PERMIT SET	99
08/14/12	ISSUE FOR PERMIT SET	100

FACILITY CODE 66T-15B6

TO
 PLANS AND SPECIFICATIONS
 FOR CONSTRUCTION OF
 NORTH GWINNETT HIGH SCHOOL
 EAST ADDITION
 FOR
 GWINNETT COUNTY BOARD OF EDUCATION
 GWINNETT COUNTY, GA

DATED: MARCH 1, 2021

SHL-D01-21

CUNNINGHAM FOREHAND MATTHEWS & MOORE, ARCHITECTS, INC.
 2011 MANCHESTER STREET, N. E.
 ATLANTA, GEORGIA 30324
 (404) 873-2152

 The following items shall take precedence over the plans and specifications (Project Manual) for the above named project and shall become a part of the Contract Documents.

Where any items called for in the specifications or indicated on the drawings are supplemented hereby, the original shall remain in effect.

Where any original item is amended, voided, or superseded hereby, the provisions of such item not specifically amended voided, or superseded shall remain in effect.

The following items shall be incorporated in the Plans and Project Manual.

 A. PROJECT MANUAL:

ITEM NO. 1: SECTION BDI, INSTRUCTIONS TO BIDDERS:

PRE-BID CONFERENCE:

As required in the Instructions to Bidders, a Mandatory Pre-Bid Conference was held this date, December 20, 2021 at 10:00 a.m.

See photo copy of original "Sign-in" sheet attached for additional contact information of attendees.

ATTENDING:

Name:

Jeff Robinson
 Alfredo Pequeno
 Nathan Heigle
 Wesley Jacques

Company:

CFMM Architects
 CFMM Architects
 McKnight Construction
 ECS Southeast, LLP

George Clackum	Kevin Price Construction
Sean Gable	MEJA Construction
Evan Cooper	Cooper & Co.
Landon Parks	Reeves Young
James Ferguson	Reeves Young
Geoffrey Ammann	Parrish Construction
Tanner Parker	Parrish Construction
Kyle Dorsey	Carroll Daniel
Griffin Self	Carroll Daniel
Jared Smith	Bowen & Watson
Steven Brown	Ids Demolition
Richard Lusk	R. K. Redding Construction
Ken Mitchell	Swofford Construction
Steve Kufrovich	Hogan Construction
Carey Bell	GCPS
Tom Gerasimek	GCPS
Merna Hussein	Reeves Young

Architect described general scope of work.

This project consists of grading, storm drainage, curb and gutter, concrete paving, concrete walks, aggregate piers, steel frame structure, CMU exterior/interior walls, brick veneer, concrete slabs on grade and elevated, singly ply roofing, hollow metal doors and frames, finish hardware, aluminum storefront and glazing, drywall and framing, carpet, VCT, porcelain and ceramic tile, acoustical ceilings, painting, casework, toilet partitions, tack and marker boards, plumbing, fire protection, HVAC, controls, fire alarm replacement, and electrical.

Site preparation and rerouting of existing utilities connected to the existing buildings and mobile classrooms shall begin over the summer of 2022. Pay careful attention to Phasing Specification and Drawing notes. Phasing of the project will include:

- Receiving the contract after the January board approval.
- Submitting critical approvals as quickly as possible for work scope to be completed during Summer of 2022 and long lead time materials that may impact the overall schedule.
- Mobilizing as soon as possible after board approval.
- Complete temporary egress construction and installation of temporary partitions to isolate the Addition construction area before school begins.

The project is broken into 3 primary phases, first completion of temporary egress construction and installation of temporary partitions to isolate the Addition construction area prior to the beginning of school. This work must be completed and approved by the Fire Marshal prior to students returning. Work shall be complete by July 8, 2022.

Contractor shall commence beginning modifications for temporary egress through the Media Center, window removal, cutting of existing pre-cast wall panels, installation of window infill, construction of temporary partitions to protect new openings for connection to new addition, modifications and replacement of equipment in existing main mechanical room and yard, demolition and roof framing construction at the existing one-story building, rerouting sanitary sewer, fire, domestic, and irrigation lines, installation of aggregate piers, installation of MSE wall, and complete new parking area May 31, 2022. All utility relocation and tie-ins must occur so that no interruption of service of the existing building will occur to disrupt normal operation of the school.

Please note, existing utilities have been shown for the contractors convenience only. There may be other utilities not shown on these plans. It shall be the contractor's responsibility to verify the locations of utilities within the limits of work. The contractor is responsible to secure the services of a private utility locator firm during the entire course of construction. The contractor shall pay for said services and the contractor shall repair all utilities damaged by construction activities at no cost to the owner.

Following approval of shop drawings, acquisition of materials, coordination with the owner, and fire marshal, contractor shall commence work on the installation of the new fire alarm system evenings, weekends, and holidays to complete all preparation for change over to the new fire alarm system by January 1, 2023. Fire Alarm for the new addition shall be complete and online by May 1, 2023.

The construction of the new addition is in Phase II and shall commence by June 16, 2022 and be complete by May 1, 2023.

In Phase III of the project, following the end of school term May 2023, contractor shall commence with removal of temporary egress modifications and removal of existing one-story storefront windows for installation of fire rated steel curtain wall windows shown on the drawings. Work shall be complete by July 1, 2023.

Contractor shall calculate available soils for backfill areas based on soils reports and if necessary provide from offsite at no additional cost to Owner. Based the existing survey, the design team anticipates that this will NOT be a balance site and will require haul in. Any required soils from off site to complete the project shall be included in the base bid. Unit cost allowances shown on the bid form and in the specifications shall be included in the base bid and are NOT to be assumed to cover the soils to be hauled in to complete the project. Allowances are to be utilized to address unforeseen conditions that arise during construction and will not be allowed to be used without approval by the design team and owner.

Contractors desiring soils report: Contact Michal McKenzie (mmckenzie@usanova.com) at NOVA Engineering by email and request report. He will reply with report attached.

Temporary Facilities does allow use of Owner power and water so long as it is not abused.

Contractors be aware of Bid Protocols, i.e., including proper bid bond, Contractor Affidavits, Sub-Contractor Affidavits, Employee Affidavits, Immigration Affidavits and Non-Collusion Affidavits, etc. in the RFP.

Owner will make building/site available to all attending Contractors. Any visits shall be scheduled through Carey Bell.

Please generate all questions by January 3, 2022 so we can respond.

All A305 Pre-Qualification Statements must be submitted and approved for bidders to officially be added to the bidder's list.

Project is anticipated to go to January Board for approval. Contract will be ready the next day.

There are no Alternates on the project.

Builder's Risk shall be contract value.

Allowances:

Be sure to follow closely and include all allowances on the bid proposal form in the base bid. Unit costs and the total amount of the allowance shall be identified where space is provided. Lump Sum miscellaneous allowances identified shall be included in the base bid as well.

ITEM NO. 2: SECTION 010200, PHASING:

At **PHASE I**, BUILDING: add the following paragraph:

"Following end of school term, May 2022, Contractor shall commence installation of aggregate piers (see Specification Section 024600 Aggregate Pier Soil Improvement) as shown and required in the contract documents as early as possible after the last day of students on campus and complete the aggregate pier installation no later than June 16, 2022."

B. DRAWINGS:ITEM NO. 1: DRAWING C0.00:

Replace drawing with revised drawing attached herein.

ITEM NO. 2: DRAWING C1.50:

Replace drawing with revised drawing attached herein.

ITEM NO. 3: DRAWING C2.00:

Replace drawing with revised drawing attached herein.

ITEM NO. 4: DRAWING C3.00:

Replace drawing with revised drawing attached herein.

ITEM NO. 5: DRAWING C3.10:

Replace drawing with revised drawing attached herein.

ITEM NO. 6: DRAWING C4.00:

Replace drawing with revised drawing attached herein.

ITEM NO. 7: DRAWING C4.05:

Replace drawing with revised drawing attached herein.

ITEM NO. 8: DRAWING C4.40:

Replace drawing with revised drawing attached herein.

ITEM NO. 9: DRAWING C4.45:

Replace drawing with revised drawing attached herein.

ITEM NO. 10: DRAWING C4.46:

Replace drawing with revised drawing attached herein.

ITEM NO. 11: DRAWING C7.00:

Replace drawing with revised drawing attached herein.

ITEM NO. 12: DRAWING C7.01:

Replace drawing with revised drawing attached herein.

ITEM NO. 13: DRAWING C7.03:

Replace drawing with revised drawing attached herein.

ITEM NO. 14: DRAWING S2.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 15: DRAWING D1.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 16: DRAWING A2.6:

Replace drawing with revised drawing attached herein.

ITEM NO. 17: DRAWING A9.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 18: DRAWING P0.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 19: DRAWING P0.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 20: DRAWING P1.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 21: DRAWING P1.4:

Replace drawing with revised drawing attached herein.

ITEM NO. 22: DRAWING P3.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 23: DRAWING M0.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 24: DRAWING M1.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 25: DRAWING M2.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 26: DRAWING M3.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 27: DRAWING DE1.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 28: DRAWING E0.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 29: DRAWING E1.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 30: DRAWING E2.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 31: DRAWING E2.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 32: DRAWING E3.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 33: DRAWING E4.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 34: DRAWING E4.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 35: DRAWING E4.3:

Replace drawing with revised drawing attached herein.

C. PRODUCT AND/OR MANUFACTURER APPROVAL:

ITEM NO. 1: The following manufacturers/products, complying with specifications, are acceptable for this project.

<u>SPECIFICATIONS</u>	<u>PRODUCT</u>	<u>MANUFACTURER</u>
071100	Waterproofing	Henry
071600	Dampproofing	Henry
075400	Mechanically Attached Thermoplastic Olefin (TPO) Single Ply Roofing System	Mule-Hide Products
101000	Visual Display Boards	ASI Visual Display Products

End of Addendum No. 3

PLEASE PRINT LEGIBLY

SIGN-IN SHEET

NORTH GWINNETT HIGH SCHOOL EAST ADDITION
 PRE-BID CONFERENCE

GWINNETT COUNTY, GA
 DECEMBER 20, 2021 @ 10:00 a.m.

NAME	COMPANY	TELEPHONE	FAX	EMAIL
Jeff Robinson	CFM&M Architects	404-873-2152	404-872-3688	jrobinson@cfmm.net
ALFREDO REEVES	CFMM	1	"	ALFREDO@CFMM.NET
Nathan Heitzle	McKnight Construction	678-637-6677	706-863-2331	Nathan@McKnightConstruction.com Bubs@McKnightConstruction.com
Wally Jacques	ECS Southeast LLC	404-586-7519		wjacquese@ecslimited.com
GEORGE CLACKUM	KEVIN PRICE CONST	404-429-6890		gclackum@kpgc.net
SEAN GABRIE	MEJA CONST	770-315-6995		Seangable@meja.us
Evan Cooper	Cooper & Co. G. Co.	770-444-2650		Bids@CooperGC.com
Landon Parks	Reeves Young	706-949-0891		lparks@reevesyoung.com
James Ferguson	Reeves Young	770-876-4104		jferguson@reevesyoung.com
GEORGE MANNAN	PARRISH CONSTRUCTION	478-244-9826		gmannan@parrishconstruction.com
TANNER PARKER	PARRISH CONSTRUCTION	478-286-0428		TANNER@ParrishConstruction.com
Kyle Dorsey	Carroll Daniel	770-536-3241		kdorsey@carrolldaniel.com
Griffin Self	Carroll Daniel	770-536-3241		gself@carrolldaniel.com
Sared Smith	Bowen - Watson	706-886-3197		bids@bowen-watson.com
Steven Brown	Ids Demolition	678-521-4719		Steven@idsdemo.com
ANDREW LUSH	A.H. ADDING CONSULT.	770-537-1845		AHL@A.H.ADDING.COM
Ken Mitchell	Swofford Const	678-945-8988		bids@swoffordconstruction.com
STEVE KUZNICH	Hogan Const.	770-546-6908		skuznich@hoganconstructiongroup.com
CAREY BELL	G.C.P.S	678-414-0335		CAREY.W.BELL@G.C.P.S.K12.ORG

PLEASE PRINT LEGIBLY

SIGN-IN SHEET

NORTH GWINNETT HIGH SCHOOL EAST ADDITION
 PRE-BID CONFERENCE

GWINNETT COUNTY, GA
 DECEMBER 20, 2021 @ 10:00 a.m.

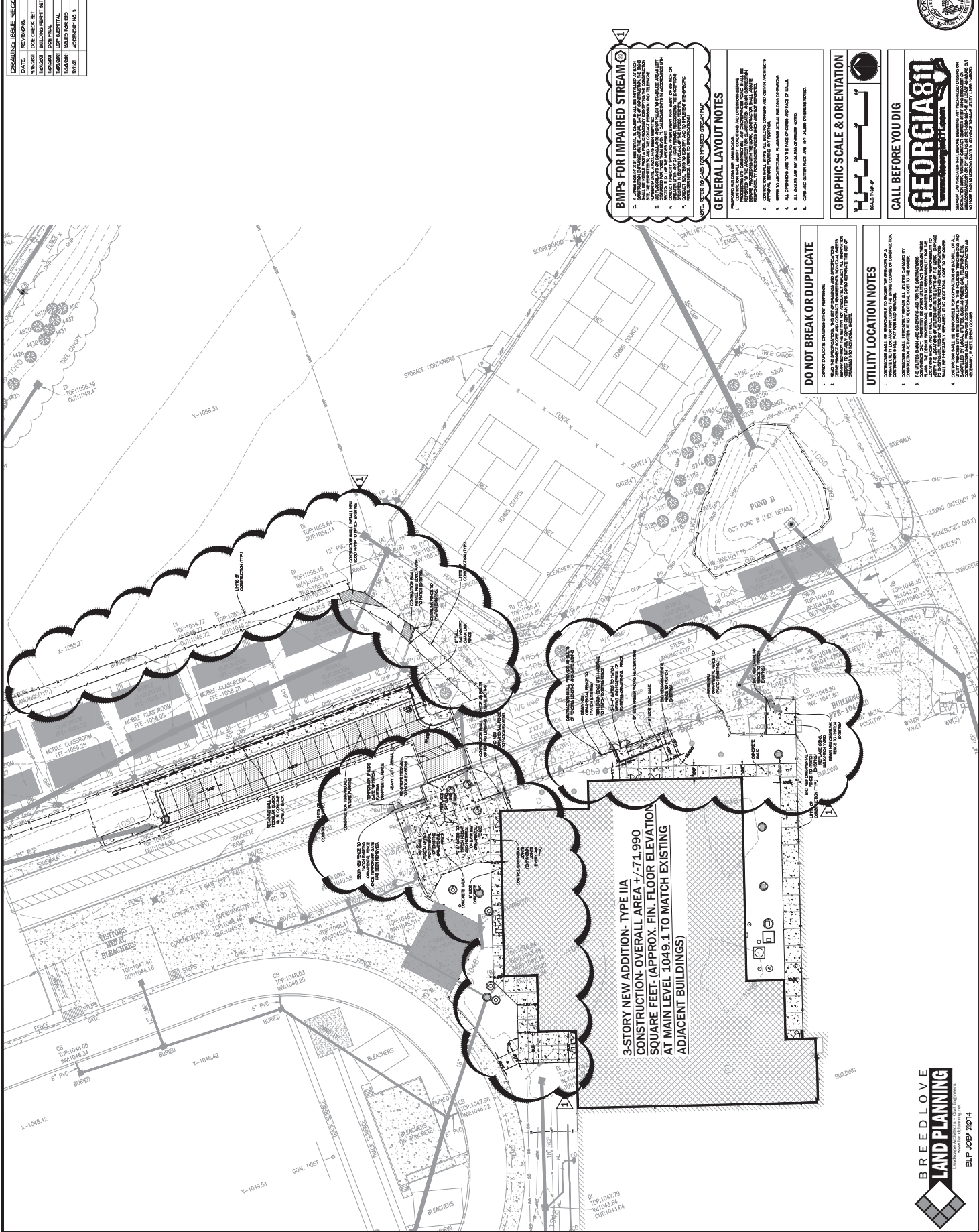
NAME	COMPANY	TELEPHONE	FAX	EMAIL
Tom Gerasimek	GCPS	770 696 3585		Tom.Gerasimek@GCPSK12.ORG
Merna Hussein	Reeves Young	765 8079294		mhusein@reevesyoung.com

cumnyham ford and matheus more

ADDITIONS AND ALTERATIONS TO
 NORTH GWINNETT HIGH SCHOOL
 20 LEVEL CREEK RD NW
 SUWANEE, GA 30066
 FOR GWINNETT COUNTY, GEORGIA
 08/15/17
 1.02
 15.00

DATE	REVISION	NO.
	ISSUED FOR PERMITS	1
	FOR GWINNETT COUNTY, GEORGIA	2
	FOR GWINNETT COUNTY, GEORGIA	3
	FOR GWINNETT COUNTY, GEORGIA	4
	FOR GWINNETT COUNTY, GEORGIA	5
	FOR GWINNETT COUNTY, GEORGIA	6
	FOR GWINNETT COUNTY, GEORGIA	7
	FOR GWINNETT COUNTY, GEORGIA	8
	FOR GWINNETT COUNTY, GEORGIA	9
	FOR GWINNETT COUNTY, GEORGIA	10

SITE LAYOUT & PAVING PLAN



BMPs FOR IMPAIRED STREAM

- CONSTRUCTION SHALL BE CONFINED TO THE IMPAIRED STREAM BUFFER ZONE.
- CONSTRUCTION SHALL NOT BE CONFINED TO THE IMPAIRED STREAM BUFFER ZONE.
- CONSTRUCTION SHALL NOT BE CONFINED TO THE IMPAIRED STREAM BUFFER ZONE.
- CONSTRUCTION SHALL NOT BE CONFINED TO THE IMPAIRED STREAM BUFFER ZONE.
- CONSTRUCTION SHALL NOT BE CONFINED TO THE IMPAIRED STREAM BUFFER ZONE.

GENERAL LAYOUT NOTES

- CONSTRUCTION SHALL BE CONFINED TO THE IMPAIRED STREAM BUFFER ZONE.
- CONSTRUCTION SHALL NOT BE CONFINED TO THE IMPAIRED STREAM BUFFER ZONE.
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- CONSTRUCTION SHALL NOT BE CONFINED TO THE IMPAIRED STREAM BUFFER ZONE.

DO NOT BREAK OR DUPLICATE

- CONTRACTOR SHALL BE RESPONSIBLE TO SECURE THE SERVICES OF A REGISTERED PROFESSIONAL ENGINEER.
- CONTRACTOR SHALL NOT BE RESPONSIBLE TO SECURE THE SERVICES OF A REGISTERED PROFESSIONAL ENGINEER.
- CONTRACTOR SHALL NOT BE RESPONSIBLE TO SECURE THE SERVICES OF A REGISTERED PROFESSIONAL ENGINEER.

UTILITY LOCATION NOTES

- CONTRACTOR SHALL BE RESPONSIBLE TO SECURE THE SERVICES OF A REGISTERED PROFESSIONAL ENGINEER.
- CONTRACTOR SHALL NOT BE RESPONSIBLE TO SECURE THE SERVICES OF A REGISTERED PROFESSIONAL ENGINEER.
- CONTRACTOR SHALL NOT BE RESPONSIBLE TO SECURE THE SERVICES OF A REGISTERED PROFESSIONAL ENGINEER.
- CONTRACTOR SHALL NOT BE RESPONSIBLE TO SECURE THE SERVICES OF A REGISTERED PROFESSIONAL ENGINEER.

GRAPHIC SCALE & ORIENTATION

CALL BEFORE YOU DIG

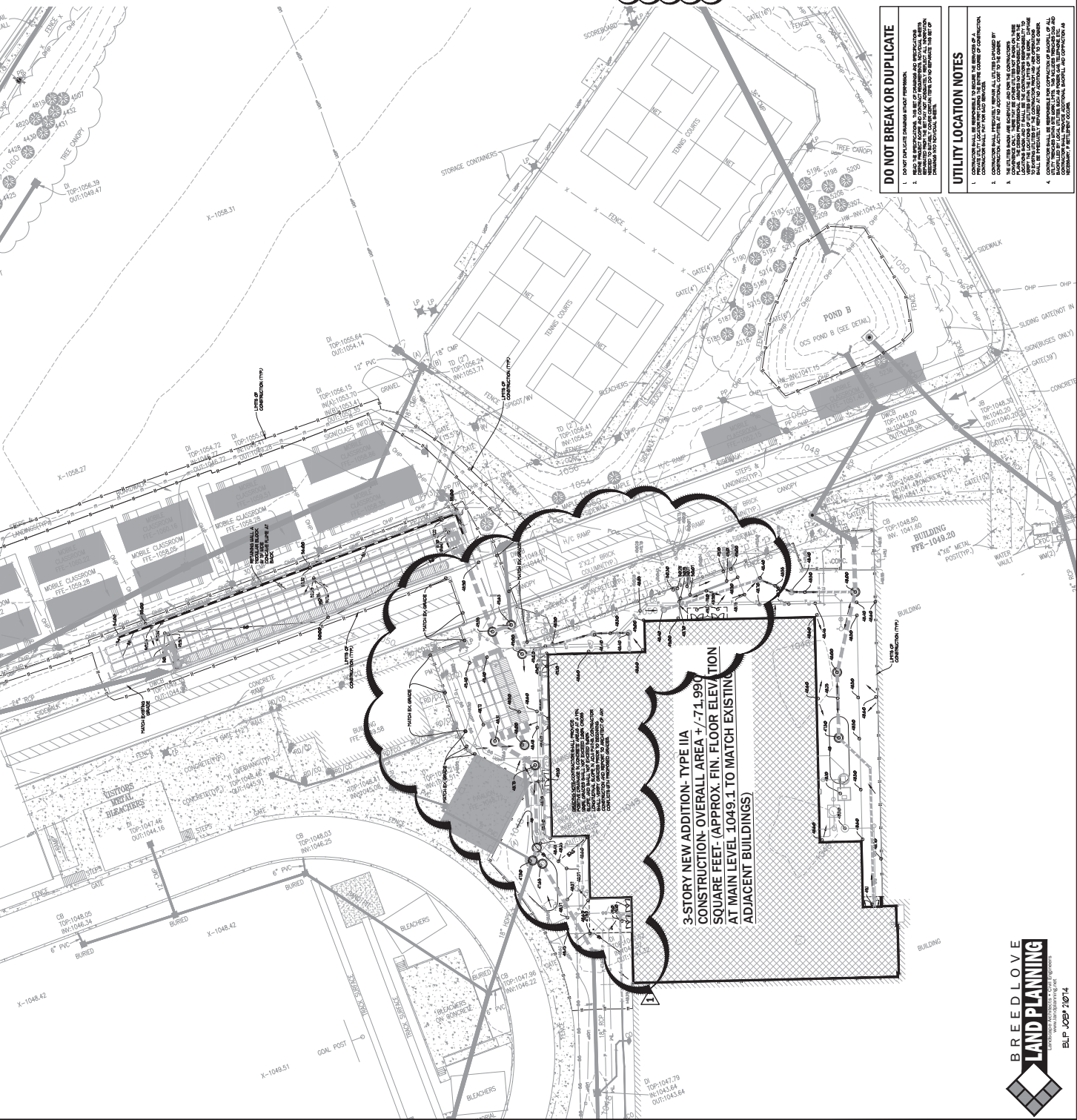
GEORGIA 811

DRAWING ISSUE RECORD		
NO.	DATE	REVISION
1		FOR GWINNETT COUNTY, GEORGIA
2		FOR GWINNETT COUNTY SCHOOLS
3		FOR GWINNETT COUNTY SCHOOLS
4		FOR GWINNETT COUNTY SCHOOLS
5		FOR GWINNETT COUNTY SCHOOLS
6		FOR GWINNETT COUNTY SCHOOLS
7		FOR GWINNETT COUNTY SCHOOLS

SITE GRADING PLAN

ADDITIONS AND ALTERATIONS TO
NORTH GWINNETT HIGH SCHOOL
20 LEVEL CREEK RD NW
DUNWOODY, GA 30094
GWINNETT COUNTY, GEORGIA
DATE: 11/20/18
SCALE: AS SHOWN

cunningham ford and mcfarlane moore
cunningham, forhand, mcfarlane & more, architects, inc. - atlanta, georgia 30324 - phone (404) 873-2152
C3.00



BMP's FOR IMPAIRED STREAM

A. ALL BMP'S (SILT TRAP, SAND TRAP, & CATCH BASIN) SHALL BE MAINTAINED AT ALL TIMES.
B. MAINTENANCE SHALL BE PERFORMED AT LEAST ONCE A MONTH.
C. MAINTENANCE SHALL BE PERFORMED AT LEAST ONCE A YEAR.
D. MAINTENANCE SHALL BE PERFORMED AT LEAST ONCE A YEAR.
E. MAINTENANCE SHALL BE PERFORMED AT LEAST ONCE A YEAR.
F. MAINTENANCE SHALL BE PERFORMED AT LEAST ONCE A YEAR.

INSUFFICIENT FILL

INSUFFICIENT FILL: A QUANTITY OF EXISTING MATERIAL, AS SHOWN ON THIS PLAN, IS INSUFFICIENT TO MAINTAIN THE EXISTING ELEVATION OF THE EXISTING STRUCTURE OR TO MAINTAIN THE EXISTING ELEVATION OF THE EXISTING STRUCTURE TO THE EXISTING ELEVATION OF THE EXISTING STRUCTURE.

EXCESS CUT

EXCESS CUT: A QUANTITY OF EXISTING MATERIAL, AS SHOWN ON THIS PLAN, IS EXCESSIVE TO MAINTAIN THE EXISTING ELEVATION OF THE EXISTING STRUCTURE OR TO MAINTAIN THE EXISTING ELEVATION OF THE EXISTING STRUCTURE TO THE EXISTING ELEVATION OF THE EXISTING STRUCTURE.

GRAPHIC SCALE & ORIENTATION

SCALE: 1" = 10'-0"

CALL BEFORE YOU DIG

GEORGIA 811

3-STORY NEW ADDITION - TYPE IIA
CONSTRUCTION - OVERALL AREA + 71,990
SQUARE FEET - APPROX. FIN. FLOOR ELEVATION
AT MAIN LEVEL 1049.1 TO MATCH EXISTING
ADIACENT BUILDINGS

DO NOT BREAK OR DUPLICATE

CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL AFFECTED AGENCIES AND UTILITIES. CONTRACTOR SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION PROVIDED HEREON. CONTRACTOR SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION PROVIDED HEREON.

UTILITY LOCATION NOTES

CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE THE SERVICES OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION PROVIDED HEREON.

BREEDLOVE
LAND PLANNING
1000 WILSON ROAD, SUITE 100
DUNWOODY, GA 30094
BLP JOB #1074



GRAPHIC SCALE & ORIENTATION

CALL BEFORE YOU DIG

GEORGIA811
ONE-CALL SERVICE

CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE THE SERVICES OF A UTILITY LOCATION NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE THE SERVICES OF A UTILITY LOCATION NOTES
2. CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE THE SERVICES OF A UTILITY LOCATION NOTES
3. CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE THE SERVICES OF A UTILITY LOCATION NOTES
4. CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE THE SERVICES OF A UTILITY LOCATION NOTES

DO NOT BREAK OR DUPLICATE

1. DO NOT DUPLICATE OR DUPLICATE
2. DO NOT DUPLICATE OR DUPLICATE
3. DO NOT DUPLICATE OR DUPLICATE
4. DO NOT DUPLICATE OR DUPLICATE

UTILITY LOCATION NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE THE SERVICES OF A UTILITY LOCATION NOTES
2. CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE THE SERVICES OF A UTILITY LOCATION NOTES
3. CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE THE SERVICES OF A UTILITY LOCATION NOTES
4. CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE THE SERVICES OF A UTILITY LOCATION NOTES

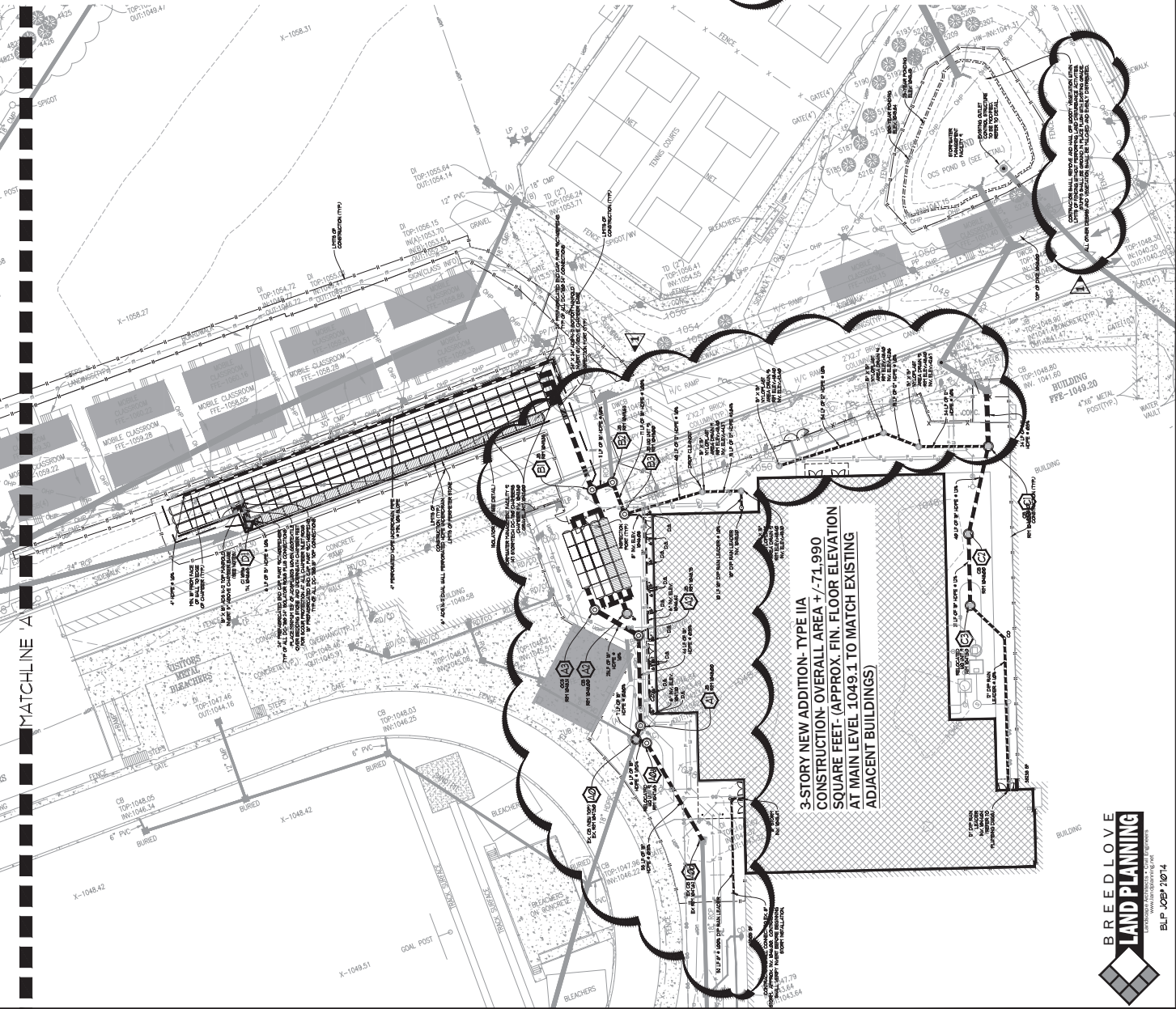
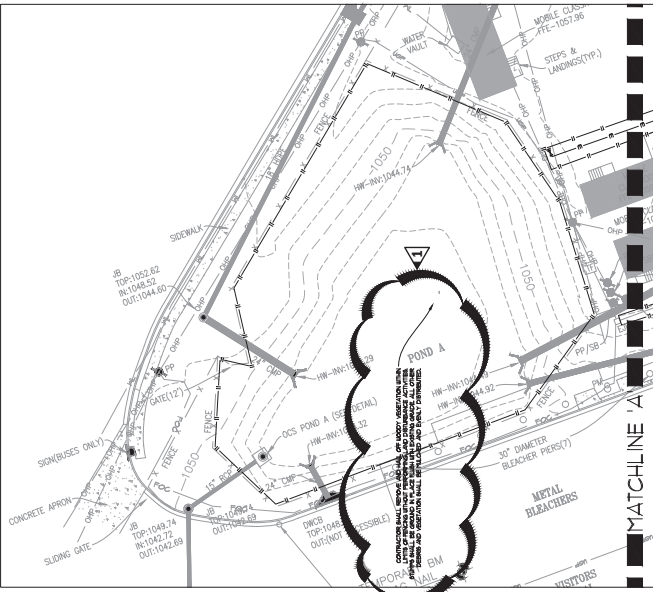
STORM DRAINAGE PLAN

NO.	DATE	REVISION
1	08/09/13	ISSUE FOR PERMIT
2	08/09/13	FOR GWINNETT COUNTY, GEORGIA
3	08/09/13	FOR GWINNETT COUNTY, GEORGIA
4	08/09/13	FOR GWINNETT COUNTY, GEORGIA
5	08/09/13	FOR GWINNETT COUNTY, GEORGIA
6	08/09/13	FOR GWINNETT COUNTY, GEORGIA
7	08/09/13	FOR GWINNETT COUNTY, GEORGIA
8	08/09/13	FOR GWINNETT COUNTY, GEORGIA
9	08/09/13	FOR GWINNETT COUNTY, GEORGIA
10	08/09/13	FOR GWINNETT COUNTY, GEORGIA

BMPs FOR IMPAIRED STREAM

- A. ALL CONSTRUCTION SHALL BE LIMITED TO THE DESIGNATED CONSTRUCTION AREA.
- B. ALL CONSTRUCTION SHALL BE LIMITED TO THE DESIGNATED CONSTRUCTION AREA.
- C. ALL CONSTRUCTION SHALL BE LIMITED TO THE DESIGNATED CONSTRUCTION AREA.
- D. ALL CONSTRUCTION SHALL BE LIMITED TO THE DESIGNATED CONSTRUCTION AREA.
- E. ALL CONSTRUCTION SHALL BE LIMITED TO THE DESIGNATED CONSTRUCTION AREA.
- F. ALL CONSTRUCTION SHALL BE LIMITED TO THE DESIGNATED CONSTRUCTION AREA.
- G. ALL CONSTRUCTION SHALL BE LIMITED TO THE DESIGNATED CONSTRUCTION AREA.
- H. ALL CONSTRUCTION SHALL BE LIMITED TO THE DESIGNATED CONSTRUCTION AREA.
- I. ALL CONSTRUCTION SHALL BE LIMITED TO THE DESIGNATED CONSTRUCTION AREA.
- J. ALL CONSTRUCTION SHALL BE LIMITED TO THE DESIGNATED CONSTRUCTION AREA.

NOTE: REFER TO CASE FOR IMPAIRED STREAM MAP



**BREEDLOVE
LAND PLANNING**

REGISTERED PROFESSIONAL ENGINEER
NO. 12427

BLP JOB 71074



2011 MANCHESTER STREET, N.E. ATLANTA, GEORGIA 30324 - PHONE (404) 873-2152

ADDITIONS AND ALTERATIONS TO NORTH GWINNETT HIGH SCHOOL FOR GWINNETT COUNTY, GEORGIA



GSWCC CHECKLIST LEGEND

GSWCC CHECKLIST ITEM NUMBER

DO NOT BREAK OR DUPLICATE

1. DO NOT DUPLICATE DRAWING SHEET NUMBERS. 2. THE CHECKLIST IS TO BE COMPLETED BY THE ARCHITECT AND THE ENGINEER. 3. THE CHECKLIST IS TO BE COMPLETED AT THE TIME OF THE PERMIT APPLICATION. 4. THE CHECKLIST IS TO BE COMPLETED AT THE TIME OF THE PERMIT APPLICATION. 5. THE CHECKLIST IS TO BE COMPLETED AT THE TIME OF THE PERMIT APPLICATION.

Table with 2 columns: Item No., Description. Includes items like 'DRAWING ISSUE RECORD', 'DATE REVISION', 'REVISION', 'BUILDING PERMIT SET', 'DATE FINAL', 'DATE PERMIT', 'DATE PERMIT', 'DATE PERMIT', 'DATE PERMIT'.

Table with 2 columns: Item No., Description. Includes items like '1. ALL APPLICANT REVIEWS SHALL INCLUDE THE FOLLOWING INFORMATION', '2. ALL APPLICANT REVIEWS SHALL INCLUDE THE FOLLOWING INFORMATION', '3. ALL APPLICANT REVIEWS SHALL INCLUDE THE FOLLOWING INFORMATION'.

Table with 2 columns: Item No., Description. Includes items like '1. ALL APPLICANT REVIEWS SHALL INCLUDE THE FOLLOWING INFORMATION', '2. ALL APPLICANT REVIEWS SHALL INCLUDE THE FOLLOWING INFORMATION', '3. ALL APPLICANT REVIEWS SHALL INCLUDE THE FOLLOWING INFORMATION'.

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Table with 2 columns: Item No., Description. Includes items like '1. ALL APPLICANT REVIEWS SHALL INCLUDE THE FOLLOWING INFORMATION', '2. ALL APPLICANT REVIEWS SHALL INCLUDE THE FOLLOWING INFORMATION', '3. ALL APPLICANT REVIEWS SHALL INCLUDE THE FOLLOWING INFORMATION'.

REPORTING OF SAMPLING: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE COLLECTION OF SAMPLES AND THE ANALYSIS OF RESULTS. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE COLLECTION OF SAMPLES AND THE ANALYSIS OF RESULTS. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE COLLECTION OF SAMPLES AND THE ANALYSIS OF RESULTS.

RETENTION OF RECORDS: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE RETENTION OF RECORDS. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE RETENTION OF RECORDS. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE RETENTION OF RECORDS.

SAMPLING FREQUENCY: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE SAMPLING FREQUENCY. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE SAMPLING FREQUENCY. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE SAMPLING FREQUENCY.

NTU LIMIT RATIONALE: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE NTU LIMIT RATIONALE. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE NTU LIMIT RATIONALE. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE NTU LIMIT RATIONALE.

CONSTRUCTION SCHEDULE: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE CONSTRUCTION SCHEDULE. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE CONSTRUCTION SCHEDULE. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE CONSTRUCTION SCHEDULE.

BIMPS FOR IMPAIRED STREAM: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE BIMPS FOR IMPAIRED STREAM. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE BIMPS FOR IMPAIRED STREAM. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE BIMPS FOR IMPAIRED STREAM.

PRE- VS. POST RUNOFF: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PRE- VS. POST RUNOFF. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PRE- VS. POST RUNOFF. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PRE- VS. POST RUNOFF.

INSPECTION & RECORD KEEPING: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE INSPECTION & RECORD KEEPING. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE INSPECTION & RECORD KEEPING. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE INSPECTION & RECORD KEEPING.

PLAN REVISIONS: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PLAN REVISIONS. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PLAN REVISIONS. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PLAN REVISIONS.

GSWCC REQUIRED NOTES: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE GSWCC REQUIRED NOTES. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE GSWCC REQUIRED NOTES. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE GSWCC REQUIRED NOTES.

SPILL PREVENTION & CONTROL: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE SPILL PREVENTION & CONTROL. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE SPILL PREVENTION & CONTROL. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE SPILL PREVENTION & CONTROL.

POST-CONSTRUCTION STORMWATER NARRATIVE: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE POST-CONSTRUCTION STORMWATER NARRATIVE. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE POST-CONSTRUCTION STORMWATER NARRATIVE. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE POST-CONSTRUCTION STORMWATER NARRATIVE.

CONSTR. MATERIAL STORAGE: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE CONSTR. MATERIAL STORAGE. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE CONSTR. MATERIAL STORAGE. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE CONSTR. MATERIAL STORAGE.

PRODUCT SPECIFIC PRACTICES: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PRODUCT SPECIFIC PRACTICES. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PRODUCT SPECIFIC PRACTICES. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PRODUCT SPECIFIC PRACTICES.

STREAM BUFFERS: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE STREAM BUFFERS. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE STREAM BUFFERS. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE STREAM BUFFERS.

INITIAL EROSION INSPECTION: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE INITIAL EROSION INSPECTION. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE INITIAL EROSION INSPECTION. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE INITIAL EROSION INSPECTION.

PROJECT RECEIVING WATERS: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PROJECT RECEIVING WATERS. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PROJECT RECEIVING WATERS. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PROJECT RECEIVING WATERS.

CONSTRUCTION ACTIVITY: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE CONSTRUCTION ACTIVITY. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE CONSTRUCTION ACTIVITY. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE CONSTRUCTION ACTIVITY.

PLAN SUBMITTAL SUMMARY: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PLAN SUBMITTAL SUMMARY. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PLAN SUBMITTAL SUMMARY. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PLAN SUBMITTAL SUMMARY.

PRIMARY PERMITTEE: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PRIMARY PERMITTEE. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PRIMARY PERMITTEE. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE PRIMARY PERMITTEE.

24-HOUR ES&PC CONTACTS: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE 24-HOUR ES&PC CONTACTS. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE 24-HOUR ES&PC CONTACTS. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE 24-HOUR ES&PC CONTACTS.

GSWCC LEVEL II CERTIFICATIONS: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE GSWCC LEVEL II CERTIFICATIONS. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE GSWCC LEVEL II CERTIFICATIONS. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE GSWCC LEVEL II CERTIFICATIONS.

STAND ALONE CONSTRUCTION PROJECTS: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE STAND ALONE CONSTRUCTION PROJECTS. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE STAND ALONE CONSTRUCTION PROJECTS. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE STAND ALONE CONSTRUCTION PROJECTS.

EROSION, SEDIMENTATION & POLLUTION CONTROL PLAN CHECKLIST: 1. THE APPLICANT SHALL BE RESPONSIBLE FOR THE EROSION, SEDIMENTATION & POLLUTION CONTROL PLAN CHECKLIST. 2. THE APPLICANT SHALL BE RESPONSIBLE FOR THE EROSION, SEDIMENTATION & POLLUTION CONTROL PLAN CHECKLIST. 3. THE APPLICANT SHALL BE RESPONSIBLE FOR THE EROSION, SEDIMENTATION & POLLUTION CONTROL PLAN CHECKLIST.

EROSION, SEDIMENTATION & POLLUTION CONTROL PLAN CHECKLIST

PROJECT NAME: NORTHWOOD HUNTERS HIDE HIGH SCHOOL

SWDC: GWINNETT COUNTY

ADDRESS: 2011 CENTRE ROAD NE, LAWRENCE, GA 30046

DESIGNER: BREED LOVE LAND PLANNING

DATE: 08/20/14

Table with 3 columns: Item No., Description, Status. Includes items like '0101. PRELIMINARY EROSION CONTROL PLAN', '0102. PRELIMINARY EROSION CONTROL PLAN', '0103. PRELIMINARY EROSION CONTROL PLAN'.

ADDITIONS AND ALTERATIONS TO NORTH GWINNETT HIGH SCHOOL FOR GWINNETT COUNTY, GEORGIA

MULCHING APPLICATION

MATERIAL	DEPTH
5% TO 10% WOOD CHIP	4" - 6"
4-1/2" WOOD CHIP	7" - 8"

FOR FINAL STABILIZATION BED MULCH, CONTRACTOR SHALL PROVIDE MIN 3" CLEAN PINE NEEDLES

MULCHING APPLICATION TABLE

TABLE 5.1: Temporary Erosion Prevention and Sedimentation Controls for Construction Sites

Plant, Lawn and Turf Establishment, Non-Soil Erosion Prevention and Sedimentation Controls for Construction Sites

Species	Plant Height	Plant Spacing	Planting Density	Planting Date	Planting Method	Notes
Grass	18" - 24"	12" x 12"	1 per 1 sq ft	April 15 - May 15	Hand planted	Grass should be planted in rows, staggered in adjacent rows.
Shrub	18" - 24"	12" x 12"	1 per 1 sq ft	April 15 - May 15	Hand planted	Shrubs should be planted in rows, staggered in adjacent rows.
Tree	18" - 24"	12" x 12"	1 per 1 sq ft	April 15 - May 15	Hand planted	Trees should be planted in rows, staggered in adjacent rows.

TABLE 5.2: Permanent Erosion Prevention and Sedimentation Controls for Construction Sites

Plant, Lawn and Turf Establishment, Non-Soil Erosion Prevention and Sedimentation Controls for Construction Sites

Species	Plant Height	Plant Spacing	Planting Density	Planting Date	Planting Method	Notes
Grass	18" - 24"	12" x 12"	1 per 1 sq ft	April 15 - May 15	Hand planted	Grass should be planted in rows, staggered in adjacent rows.
Shrub	18" - 24"	12" x 12"	1 per 1 sq ft	April 15 - May 15	Hand planted	Shrubs should be planted in rows, staggered in adjacent rows.
Tree	18" - 24"	12" x 12"	1 per 1 sq ft	April 15 - May 15	Hand planted	Trees should be planted in rows, staggered in adjacent rows.

TABLE 5.3: Permanent Erosion Prevention and Sedimentation Controls for Construction Sites

Plant, Lawn and Turf Establishment, Non-Soil Erosion Prevention and Sedimentation Controls for Construction Sites

Species	Plant Height	Plant Spacing	Planting Density	Planting Date	Planting Method	Notes
Grass	18" - 24"	12" x 12"	1 per 1 sq ft	April 15 - May 15	Hand planted	Grass should be planted in rows, staggered in adjacent rows.
Shrub	18" - 24"	12" x 12"	1 per 1 sq ft	April 15 - May 15	Hand planted	Shrubs should be planted in rows, staggered in adjacent rows.
Tree	18" - 24"	12" x 12"	1 per 1 sq ft	April 15 - May 15	Hand planted	Trees should be planted in rows, staggered in adjacent rows.

TABLE 5.4: Permanent Erosion Prevention and Sedimentation Controls for Construction Sites

Plant, Lawn and Turf Establishment, Non-Soil Erosion Prevention and Sedimentation Controls for Construction Sites

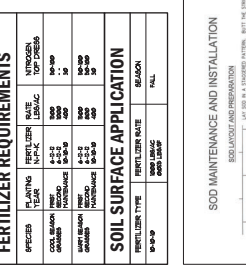
Species	Plant Height	Plant Spacing	Planting Density	Planting Date	Planting Method	Notes
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Tree	18" - 24"	12" x 12"	1 per 1 sq ft	April 15 - May 15	Hand planted	Trees should be planted in rows, staggered in adjacent rows.

SOD APPLICATION

GROUP	VARIETIES	RESOURCES	SEASON
GRASS	PERennial	PERennial	SUMMER
WOOD	WOOD	WOOD	WOOD
SHRUB	SHRUB	SHRUB	SHRUB
TREE	TREE	TREE	TREE

FERTILIZER REQUIREMENTS

FERTILIZER TYPE	FERTILIZER RATE	SEASON
10-10-10	100 LBS/A	FALL
20-20-20	50 LBS/A	FALL
30-30-30	33 LBS/A	FALL
40-40-40	25 LBS/A	FALL
50-50-50	16 LBS/A	FALL



VEGETATIVE PLAN FOR SODDING

Planting Date	Planting Method	Notes
April 15 - May 15	Hand planted	Grass should be planted in rows, staggered in adjacent rows.
April 15 - May 15	Hand planted	Shrubs should be planted in rows, staggered in adjacent rows.
April 15 - May 15	Hand planted	Trees should be planted in rows, staggered in adjacent rows.

VEGETATIVE PLAN FOR SODDING

Planting Date	Planting Method	Notes
April 15 - May 15	Hand planted	Grass should be planted in rows, staggered in adjacent rows.
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VEGETATIVE PLAN FOR SODDING

Planting Date	Planting Method	Notes
April 15 - May 15	Hand planted	Grass should be planted in rows, staggered in adjacent rows.
April 15 - May 15	Hand planted	Shrubs should be planted in rows, staggered in adjacent rows.
April 15 - May 15	Hand planted	Trees should be planted in rows, staggered in adjacent rows.

Disturbed Area Stabilization (With Mulching Only) Dst1

SPECIFICATIONS

Mulching Without Seeding
This standard applies to graded or cleared areas where the contractor is required to stabilize the area by mulching the surface. Mulch shall be applied to a minimum depth of 2 inches.

Site Preparation

- Grades to prevent the use of equipment for any other purpose.
- Apply mulch to the entire area to be stabilized. Mulch shall be applied to a minimum depth of 2 inches.
- Loosen compact soil to a minimum depth of 2 inches.

Mulching Methods
Select one of the following materials and apply to the depth indicated:

- Straw or hay shall be applied to a depth of 2 to 3 inches. Organic mulch shall be applied to a depth of 2 to 3 inches. Organic mulch shall be applied to a depth of 2 to 3 inches.
- Wood chips (chips, sawdust or bark) shall be applied to a depth of 2 to 3 inches. Organic mulch shall be applied to a depth of 2 to 3 inches. Organic mulch shall be applied to a depth of 2 to 3 inches.
- Polystyrene film shall be secured over banks or adjacent areas. Material for stabilization shall be applied to a minimum depth of 2 inches.

Applying Mulch
When mulch is used for soil covering, mulch shall be applied to provide full coverage of the exposed area.

Planting

- Straw or hay mulch and wood chips shall be applied to a depth of 2 to 3 inches.
- Polystyrene film shall be secured over banks or adjacent areas.

Disturbed Area Stabilization (With Mulching Only) Dst1

SOIL AMENDMENTS

When used for soil covering, mulch shall be applied to provide full coverage of the exposed area.

Planting

- Straw or hay mulch and wood chips shall be applied to a depth of 2 to 3 inches.
- Polystyrene film shall be secured over banks or adjacent areas.

VEGETATIVE PLAN - PIEDMONT VEGETATIVE COVERS

Planting Date	Planting Method	Notes
April 15 - May 15	Hand planted	Grass should be planted in rows, staggered in adjacent rows.
April 15 - May 15	Hand planted	Shrubs should be planted in rows, staggered in adjacent rows.
April 15 - May 15	Hand planted	Trees should be planted in rows, staggered in adjacent rows.

VEGETATIVE PLAN - PIEDMONT VEGETATIVE COVERS

Planting Date	Planting Method	Notes
April 15 - May 15	Hand planted	Grass should be planted in rows, staggered in adjacent rows.
April 15 - May 15	Hand planted	Shrubs should be planted in rows, staggered in adjacent rows.
April 15 - May 15	Hand planted	Trees should be planted in rows, staggered in adjacent rows.

BMPs for Impaired Stream

SWPPP

DO NOT BREAK OR DUPLICATE

24-HOUR EROSION CONTROL

DO NOT BREAK OR DUPLICATE

SWPPP

ADDITIONS AND ALTERATIONS TO

VEGETATIVE PLAN - PIEDMONT VEGETATIVE COVERS

DO NOT BREAK OR DUPLICATE

SWPPP

ADDITIONS AND ALTERATIONS TO

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ADDITIONS AND ALTERATIONS TO

VEGETATIVE PLAN - PIEDMONT VEGETATIVE COVERS

DO NOT BREAK OR DUPLICATE

SWPPP

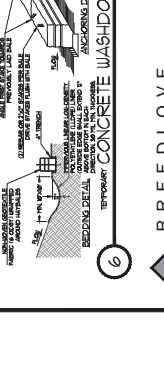
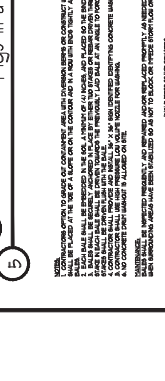
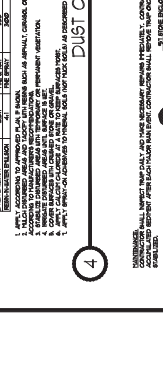
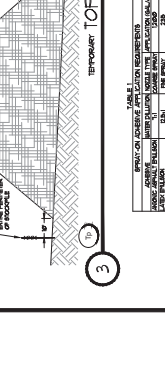
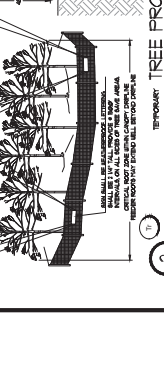
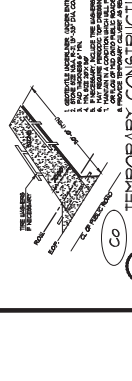
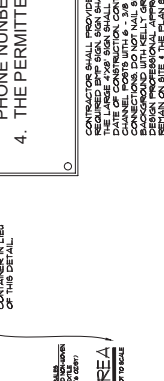
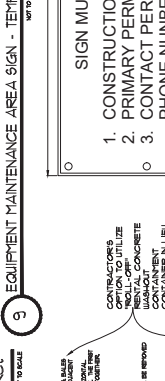
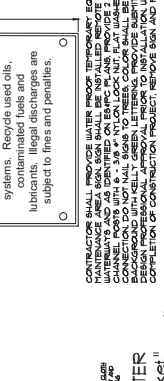
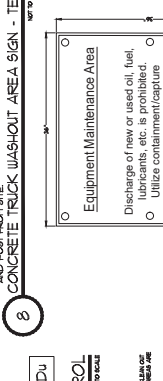
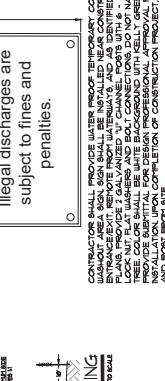
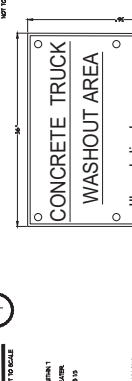
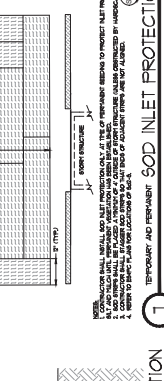
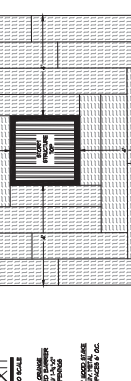
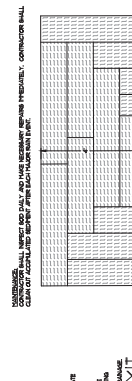
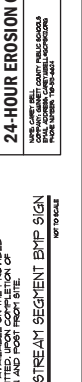
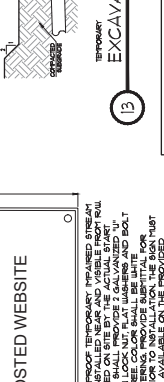
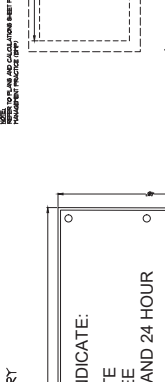
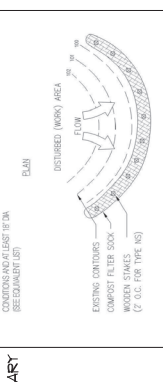
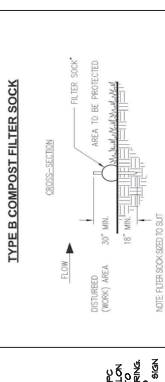
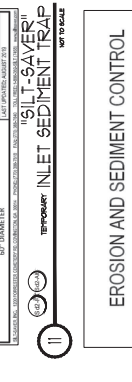
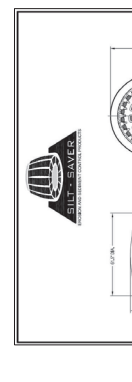
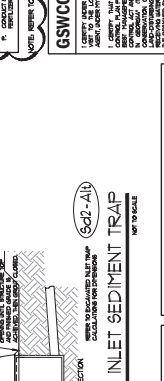
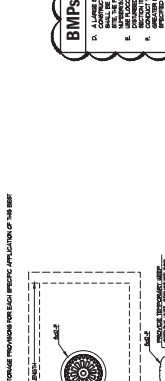
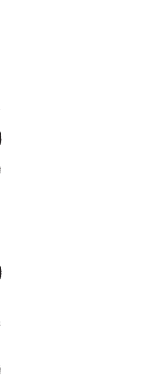
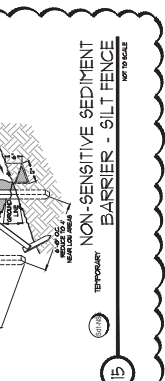
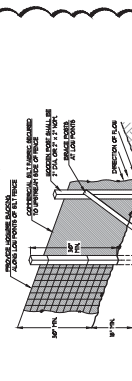
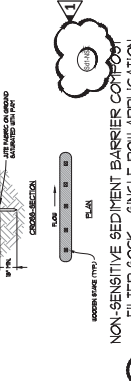
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10/20/2017	DATE FOR BID	4
10/20/2017	DATE FOR BID	5
10/20/2017	DATE FOR BID	6
10/20/2017	DATE FOR BID	7
10/20/2017	DATE FOR BID	8
10/20/2017	DATE FOR BID	9
10/20/2017	DATE FOR BID	10

ES&PC DETAILS

ADDITIONS AND ALTERATIONS TO
NORTH GWINNETT HIGH SCHOOL
220 GWINNETT COUNTY CENTER
GWINNETT, GEORGIA 30227
FOR GWINNETT COUNTY SCHOOLS
30324 - phone (404) 873-2152
AUGUST 1, 2018
C4.46

Curryton Federal Materials

NOTES:
1. CONTRACTOR SHALL PROVIDE WATER PROOF TEMPORARY CONCRETE EQUIPMENT MAINTENANCE AREA SIGN - TEMPORARY (SEE DETAIL 10) TO ALL EQUIPMENT MAINTENANCE AREAS.
2. CONTRACTOR SHALL PROVIDE CONCRETE TRUCK WASHOUT AREA SIGN - TEMPORARY (SEE DETAIL 8) TO ALL CONCRETE TRUCK WASHOUT AREAS.
3. CONTRACTOR SHALL PROVIDE EQUIPMENT MAINTENANCE AREA SIGN - TEMPORARY (SEE DETAIL 10) TO ALL EQUIPMENT MAINTENANCE AREAS.
4. CONTRACTOR SHALL PROVIDE CONCRETE TRUCK WASHOUT AREA SIGN - TEMPORARY (SEE DETAIL 8) TO ALL CONCRETE TRUCK WASHOUT AREAS.
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20. CONTRACTOR SHALL PROVIDE CONCRETE TRUCK WASHOUT AREA SIGN - TEMPORARY (SEE DETAIL 8) TO ALL CONCRETE TRUCK WASHOUT AREAS.



BREED LOVE LAND PLANNING
LAND DEVELOPMENT CONSULTANTS & ARCHITECTS
B.L.P. 029 / 1074

CONTRACTOR SIGN MUST INDICATE:
1. CONSTRUCTION SITE
2. PRIMARY PERMITTEE
3. CONTACT PERSON AND 24 HOUR PHONE NUMBER
4. THE PERMITTEE-HOSTED WEBSITE

CONTRACTOR SHALL PROVIDE WATER PROOF TEMPORARY CONCRETE EQUIPMENT MAINTENANCE AREA SIGN - TEMPORARY (SEE DETAIL 10) TO ALL EQUIPMENT MAINTENANCE AREAS. REQUIRED BY PERMITS AND VISIBLE FROM ROAD.
DATE OF CONSTRUCTION CONTRACT SHALL BE THE DATE OF PERMITTEE-HOSTED WEBSITE.
CHANNEL POSTS WITH A 3/8\"/>

CONTRACTOR SHALL PROVIDE CONCRETE TRUCK WASHOUT AREA SIGN - TEMPORARY (SEE DETAIL 8) TO ALL CONCRETE TRUCK WASHOUT AREAS. REQUIRED BY PERMITS AND VISIBLE FROM ROAD.
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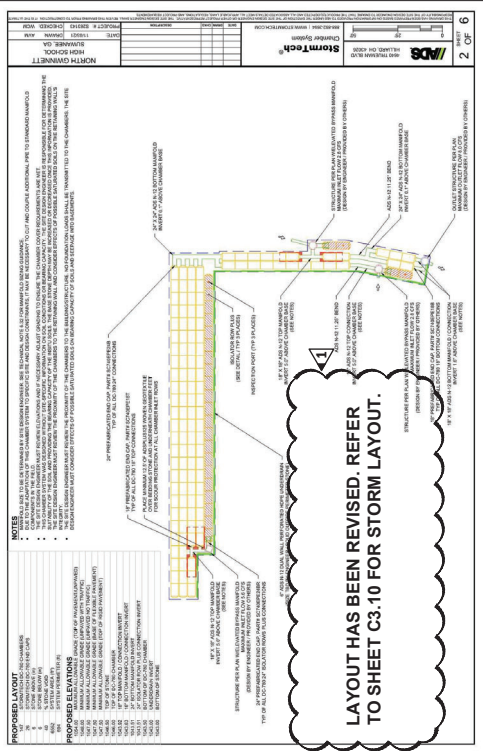
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CHANNEL POSTS WITH A 3/8\"/>

DATE	REVISION	NO.
10/14/2021	DOE CHECK MET	1
10/15/2021	DOE FINAL	2
10/20/2021	DOE CHECK FOR BID	3
10/20/2021	AS BUILT	4

SITE WORK CONSTRUCTION DETAILS





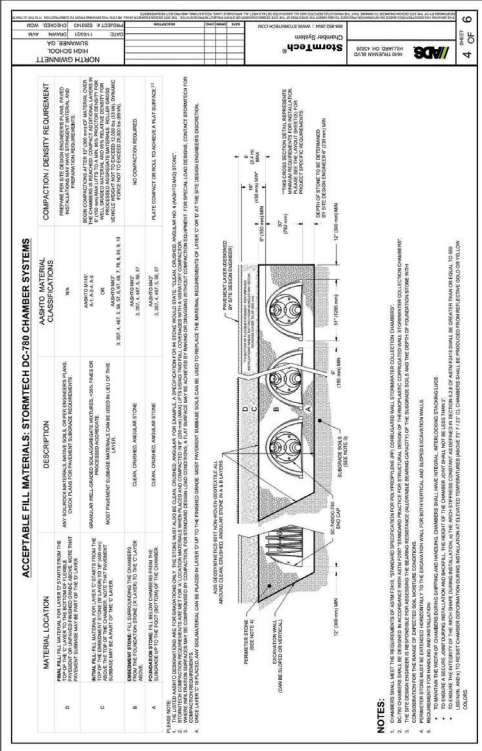
ADS
Advanced Drainage Systems, Inc.
SUWANEE, GA


DC-788 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBER SHALL BE PROTECTED AGAINST PESTS...
- CHAMBER SHALL BE PROTECTED AGAINST... FROM VEHICLE IMPACTS...
- CHAMBER SHALL BE PROTECTED AGAINST... FROM... PROTECTION...
- CHAMBER SHALL BE PROTECTED AGAINST... FROM... PROTECTION...
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IMPORTANT NOTES FOR THE DESIGN AND INSTALLATION OF THE DC-788 CHAMBER SYSTEM

- CONSTRUCTION OF CHAMBER SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S REPRESENTATIVE'S COMPANY P.F.A.
- CONSTRUCTION OF CHAMBER SHALL BE IN ACCORDANCE WITH THE STORMTECH DESIGNING/CONSTRUCTION GUIDELINES.
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ADS
Advanced Drainage Systems, Inc.
SUWANEE, GA

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24-HOUR EROSION CONTACT

FOR THE LIFE OF THE PROJECT, THE CONTRACTOR SHALL MAINTAIN 24-HOUR EROSION CONTROL MEASURES IN PLACE UNTIL THE 24-HOUR EROSION CONTACT PERIOD IS COMPLETE.

DO NOT BREAK OR DUPLICATE

1. SIGN THE PROTECTION. 2. NO SIGN OF PROTECTION AND PROTECTION IS REQUIRED TO BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD TO MAINTAIN THE PROTECTION OF THE PROJECT.

UTILITY LOCATION NOTES

- VERIFY ALL UTILITY LOCATIONS WITH THE OWNER AND CONTRACTOR.
- VERIFY ALL UTILITY LOCATIONS WITH THE OWNER AND CONTRACTOR.
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BMPs FOR IMPAIRED STREAM

- ALL BMPs SHALL BE INSTALLED AT EACH STREAM CROSSING AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
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CALL BEFORE YOU DIG

GEORGIA811

BEFORE YOU DIG, CALL 811. WE'LL FIND ALL UTILITIES IN YOUR AREA, FREE OF CHARGE.





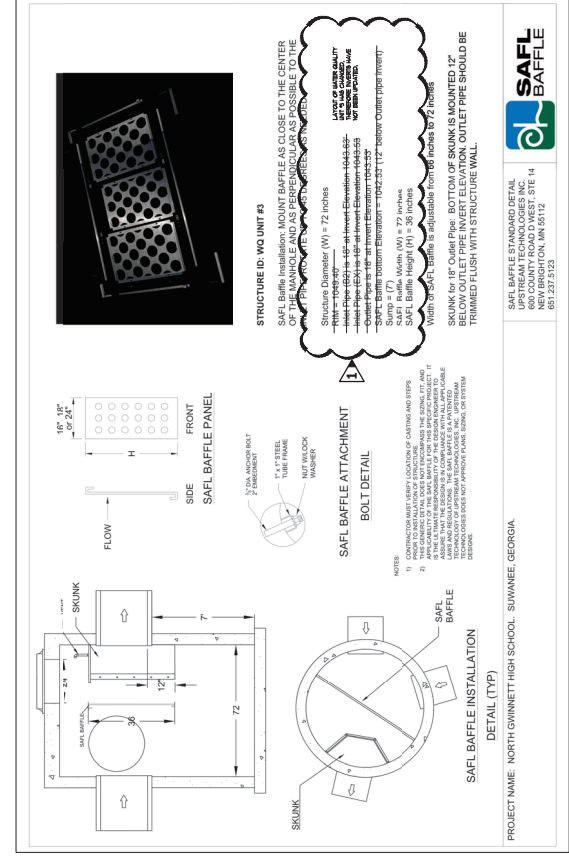
ADDITIONS AND ALTERATIONS TO
NORTH GWINNETT HIGH SCHOOL
202 GUNNERS CIRCLE, SUITE 100
GWINNETT, GEORGIA 30202
FOR GWINNETT COUNTY, GEORGIA
ARCHITECT: J. MOORE & ASSOCIATES
1000 GUNNERS CIRCLE, SUITE 100
GWINNETT, GEORGIA 30202
DATE: 10/20/11
JOB NO: 11-001

anyham fedard mdhew mce
cunningham, forhand, matthews & moore, architects, inc. - atlanta, georgia 30324 - phone (404) 873-2152
C7.03



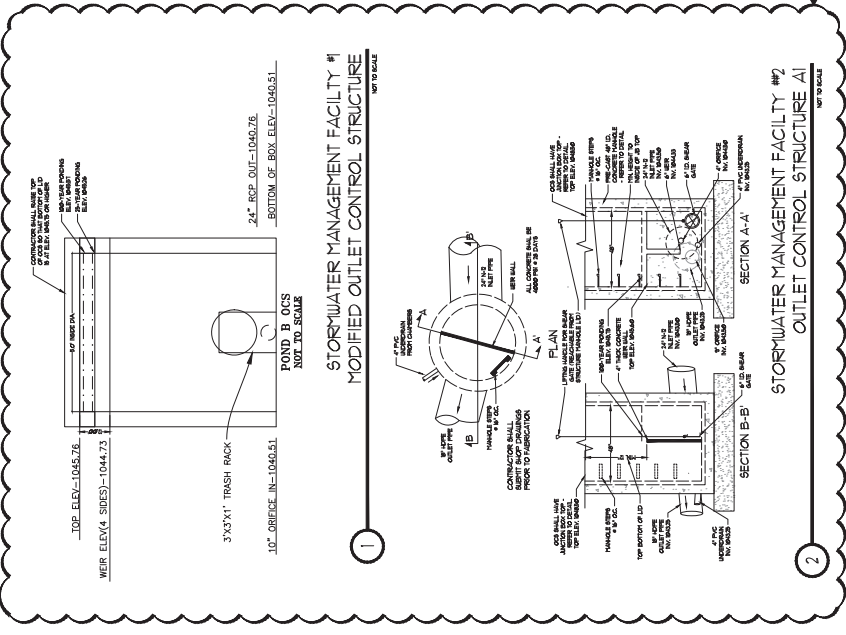
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10/20/11	DOE FINAL	3
10/20/11	DOE FINAL	4
10/20/11	PERMITS FOR BID	5
10/20/11	AS BUILT	6
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10/20/11	AS BUILT	99
10/20/11	AS BUILT	100

SITE WORK CONSTRUCTION DETAILS



SAFEL Baffle
SAFEL Baffle, Inc.
600 COUNTY ROAD TO WEST SITE 14
MOUNTAIN VIEW, IN 46051
857.237.5152

**STORM STRUCTURE B1
JB WATER QUALITY UNIT #3**
8\"/>



**STORMWATER MANAGEMENT FACILITY #2
OUTLET CONTROL STRUCTURE A1**
8\"/>

BMPs FOR IMPAIRED STREAM

1. ALL BMPs SHALL BE INSTALLED AS SHOWN AND MAINTAINED AS SHOWN.
2. BMPs SHALL BE INSTALLED IN THE ORDER OF CONSTRUCTION AS SHOWN.
3. BMPs SHALL BE INSTALLED IN THE ORDER OF CONSTRUCTION AS SHOWN.
4. BMPs SHALL BE INSTALLED IN THE ORDER OF CONSTRUCTION AS SHOWN.
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10. BMPs SHALL BE INSTALLED IN THE ORDER OF CONSTRUCTION AS SHOWN.

CALL BEFORE YOU DIG
GEORGIA811
www.georgia811.com

24-HOUR EROSION CONTACT

FOR ALL EROSION CONTROL MEASURES, CONTACT THE FOLLOWING PERSONS IMMEDIATELY:

1. DO NOT DISTURB EROSION CONTROL MEASURES UNTIL THEY ARE COMPLETELY REPAIRED AND APPROVED.

UTILITY LOCATION NOTES

1. CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS AND DEPTHS AS SHOWN ON THE PLANS.
2. CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS AND DEPTHS AS SHOWN ON THE PLANS.
3. CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS AND DEPTHS AS SHOWN ON THE PLANS.
4. CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS AND DEPTHS AS SHOWN ON THE PLANS.



BLP JOB 1074

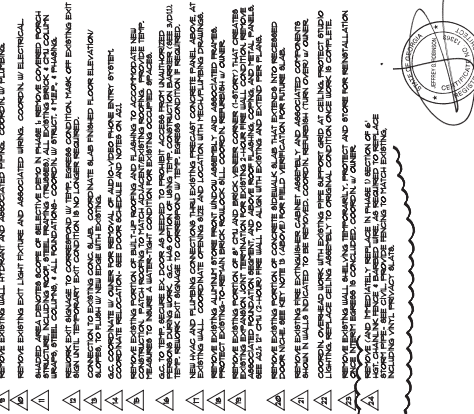
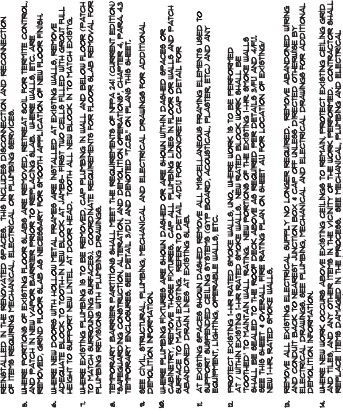
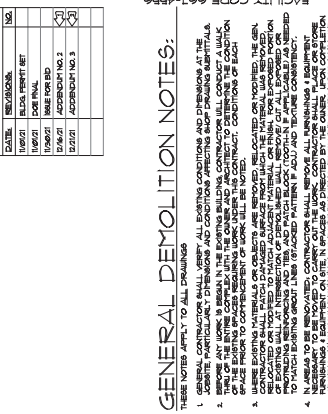
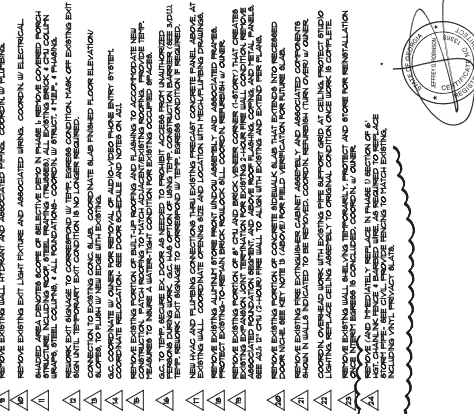
NORTH GWINNETT HIGH SCHOOL
EAST ADDITION
20 LEVEL CREEK RAVINE, GA 30024
GWINNETT COUNTY BOARD OF EDUCATION
GWINNETT COUNTY, GEORGIA

DATE	REVISION	NO
10/27/11	BLACK PENTH SET	01
10/27/11	DOOR FINISH	02
11/02/11	ADDITION NO. 2	03
11/02/11	ADDITION NO. 3	04

- GENERAL DEMOLITION NOTES:**
1. THESE NOTES APPLY TO ALL DRAWINGS.
 2. GENERAL CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND CONDITIONS AT THE TIME OF WORK. IF DISCREPANCIES ARE FOUND, THE GENERAL CONTRACTOR SHALL CONTACT THE ARCHITECT IMMEDIATELY.
 3. ALL EXISTING WALLS SHALL BE DEMOLISHED TO FINISH FLOOR FINISH UNLESS OTHERWISE INDICATED. WALLS TO BE DEMOLISHED SHALL BE IDENTIFIED WITH THE SHOWN DEMOLITION SYMBOLS.
 4. CONTRACTOR SHALL PROVIDE PROTECTIVE BRACING TO MAINTAIN THE INTEGRITY OF EXISTING STRUCTURE THROUGHOUT DEMOLITION WORK. BRACING SHALL BE INSTALLED TO PREVENT COLLAPSE OF EXISTING WALLS AND FLOOR SLABS DURING DEMOLITION WORK.
 5. CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES AND SERVICE CONNECTIONS UNLESS OTHERWISE INDICATED.
 6. CONTRACTOR SHALL PROTECT ALL EXISTING STRUCTURE TO REMAIN FROM DAMAGE BY DEMOLITION WORK. PROTECTIVE BRACING SHALL BE INSTALLED TO PREVENT COLLAPSE OF EXISTING WALLS AND FLOOR SLABS DURING DEMOLITION WORK.
 7. CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES AND SERVICE CONNECTIONS UNLESS OTHERWISE INDICATED.
 8. CONTRACTOR SHALL MAINTAIN ALL EXISTING STRUCTURE TO REMAIN FROM DAMAGE BY DEMOLITION WORK. PROTECTIVE BRACING SHALL BE INSTALLED TO PREVENT COLLAPSE OF EXISTING WALLS AND FLOOR SLABS DURING DEMOLITION WORK.
 9. CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES AND SERVICE CONNECTIONS UNLESS OTHERWISE INDICATED.
 10. CONTRACTOR SHALL MAINTAIN ALL EXISTING STRUCTURE TO REMAIN FROM DAMAGE BY DEMOLITION WORK. PROTECTIVE BRACING SHALL BE INSTALLED TO PREVENT COLLAPSE OF EXISTING WALLS AND FLOOR SLABS DURING DEMOLITION WORK.

- DEMOLITION KEY NOTES:**
1. NO DEMOLITION REQUIRED AT THE SPACE UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWING.
 2. DEMOLITION TO BE COMPLETED BY 10:00 A.M. THE FOLLOWING DAY.
 3. CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES AND SERVICE CONNECTIONS UNLESS OTHERWISE INDICATED.
 4. CONTRACTOR SHALL MAINTAIN ALL EXISTING STRUCTURE TO REMAIN FROM DAMAGE BY DEMOLITION WORK. PROTECTIVE BRACING SHALL BE INSTALLED TO PREVENT COLLAPSE OF EXISTING WALLS AND FLOOR SLABS DURING DEMOLITION WORK.
 5. CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES AND SERVICE CONNECTIONS UNLESS OTHERWISE INDICATED.
 6. CONTRACTOR SHALL MAINTAIN ALL EXISTING STRUCTURE TO REMAIN FROM DAMAGE BY DEMOLITION WORK. PROTECTIVE BRACING SHALL BE INSTALLED TO PREVENT COLLAPSE OF EXISTING WALLS AND FLOOR SLABS DURING DEMOLITION WORK.

- DEMOLITION LEGEND:**
- | | |
|----------|--|
| [Symbol] | REMOVE EXISTING WALLS TO FINISH FLOOR FINISH |
| [Symbol] | REMOVE EXISTING WALLS TO FINISH CEILING |
| [Symbol] | REMOVE EXISTING WALLS TO FINISH GROUND |
| [Symbol] | REMOVE EXISTING WALLS TO FINISH EXTERIOR |
| [Symbol] | REMOVE EXISTING WALLS TO FINISH UNLESS OTHERWISE INDICATED |
| [Symbol] | REMOVE EXISTING WALLS TO FINISH UNLESS OTHERWISE INDICATED |



1. SECOND LEVEL DEMOLITION PLAN

2. THIRD LEVEL DEMOLITION PLAN

3. OVERALL MAIN LEVEL DEMOLITION PLAN - PHASED WORK

DEMOLITION KEY PLAN

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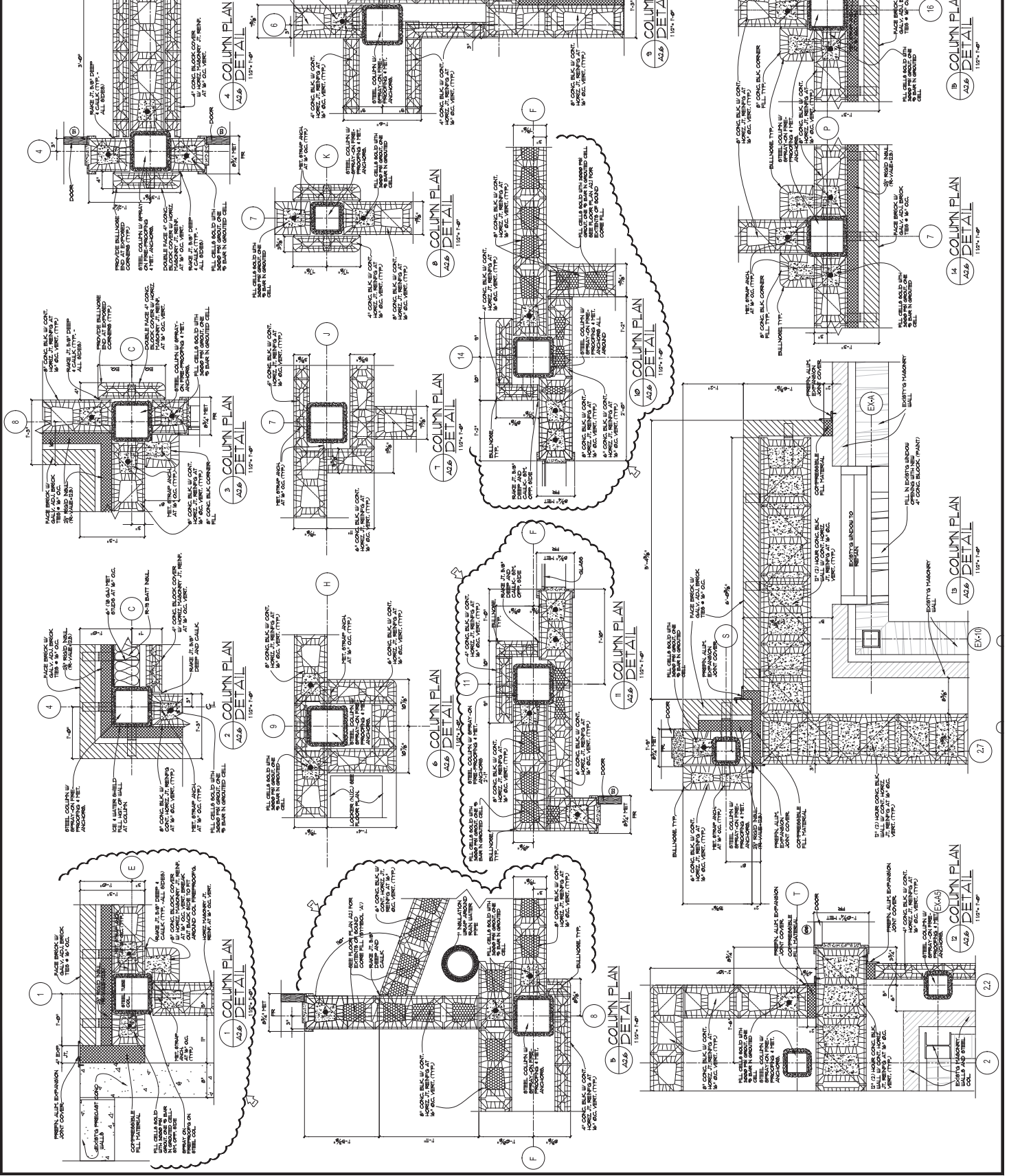
DEMOLITION KEY PLAN

DEMOLITION KEY PLAN

DEMOLITION KEY PLAN

FACILITY CODE 667-4596

NO.	DATE	REVISION
1	10/27/21	DOE FINAL
2	11/02/21	DOE FINAL
3	11/02/21	ADDITION NO. 3



FACILITY CODE 667-4596

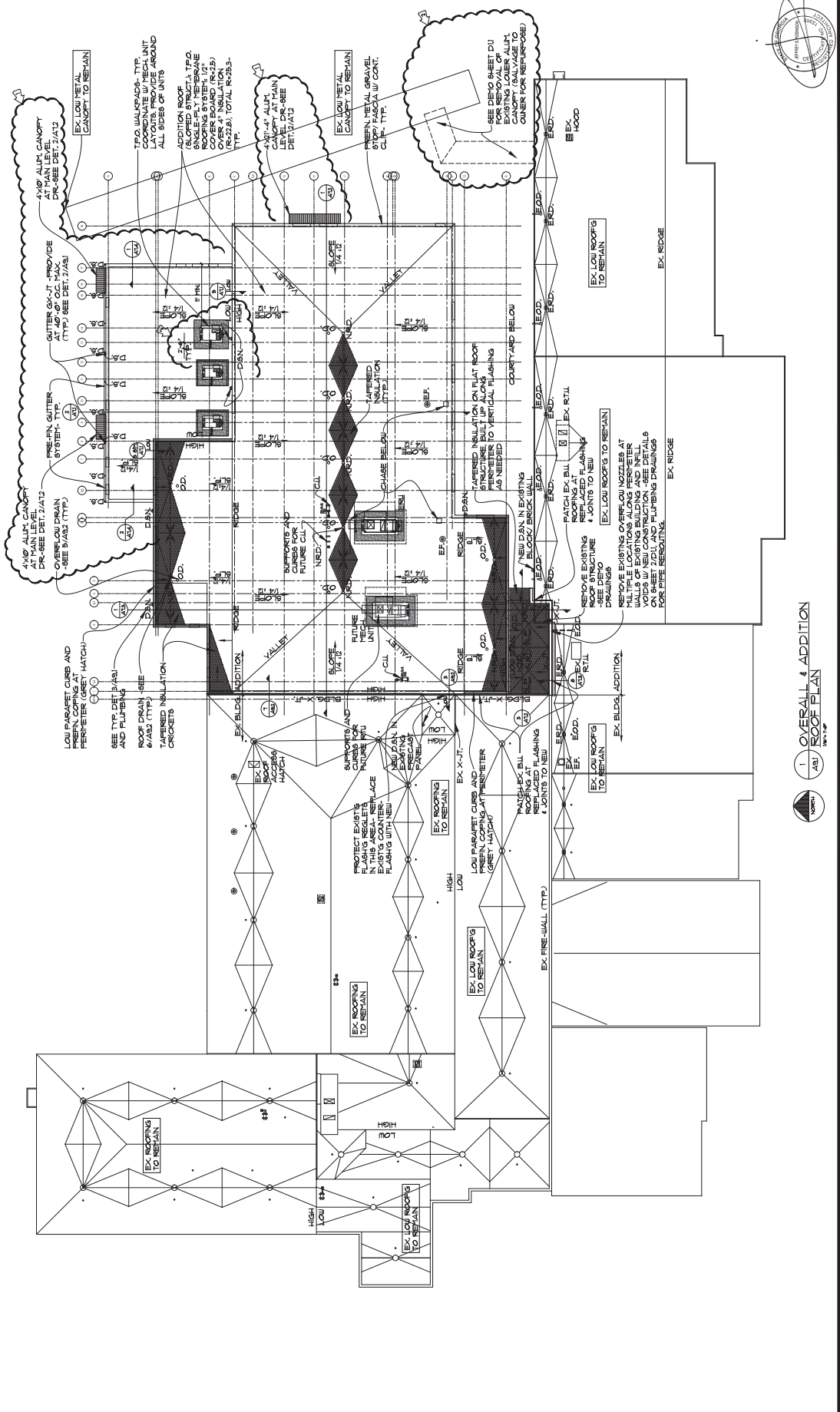
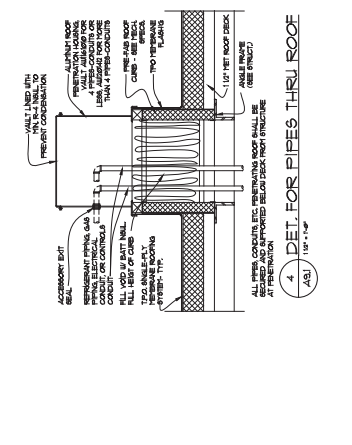
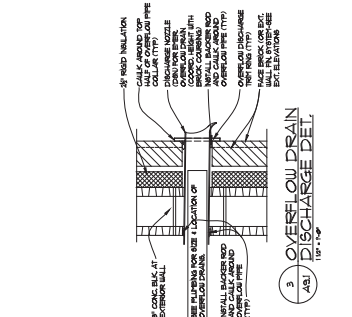
NO.	REVISION	DATE
1	ISSUE RECORD	
2	ISSUE RECORD	
3	ISSUE RECORD	
4	ISSUE RECORD	
5	ISSUE RECORD	
6	ISSUE RECORD	

ROOF PLAN LEGEND

SYMBOL	DESCRIPTION
[Symbol]	ROOF FLOOR FINISH
[Symbol]	ROOF STRUCTURE
[Symbol]	ROOF INSULATION
[Symbol]	ROOF DRAIN
[Symbol]	ROOF VENT
[Symbol]	ROOF CURB
[Symbol]	ROOF FLASHING
[Symbol]	ROOF EAVES
[Symbol]	ROOF RISE
[Symbol]	ROOF FALL
[Symbol]	ROOF VALLEY
[Symbol]	ROOF RIDGE
[Symbol]	ROOF CHASE
[Symbol]	ROOF HATCH
[Symbol]	ROOF CURB
[Symbol]	ROOF FLASHING
[Symbol]	ROOF EAVES
[Symbol]	ROOF RISE
[Symbol]	ROOF FALL
[Symbol]	ROOF VALLEY
[Symbol]	ROOF RIDGE
[Symbol]	ROOF CHASE

GENERAL NOTES:

1. GUTTERS AND LOCATIONS OF ROOF TOP MECHANICAL EQUIPMENT ARE APPROXIMATE. SEE CONTRACTOR MEET AND CONFERENCE FOR FINAL LOCATIONS AND SIZES. PROVIDE SUFFICIENT SUPPORT AND ROOF OVERLAP TO PROTECT POSITIVE DRAINAGE. PROVIDE SUFFICIENT OVERLAP TO PROTECT POSITIVE DRAINAGE. PROVIDE SUFFICIENT OVERLAP TO PROTECT POSITIVE DRAINAGE.
2. CONTRACTOR TO PROVIDE POSITIVE DRAINAGE TO ALL ROOF DRAINS AND GUTTERS AS SHOWN.
3. PROVIDE POSITIVE DRAINAGE TO ALL ROOF DRAINS AND GUTTERS AS SHOWN.
4. PROVIDE POSITIVE DRAINAGE TO ALL ROOF DRAINS AND GUTTERS AS SHOWN.
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20. PROVIDE POSITIVE DRAINAGE TO ALL ROOF DRAINS AND GUTTERS AS SHOWN.

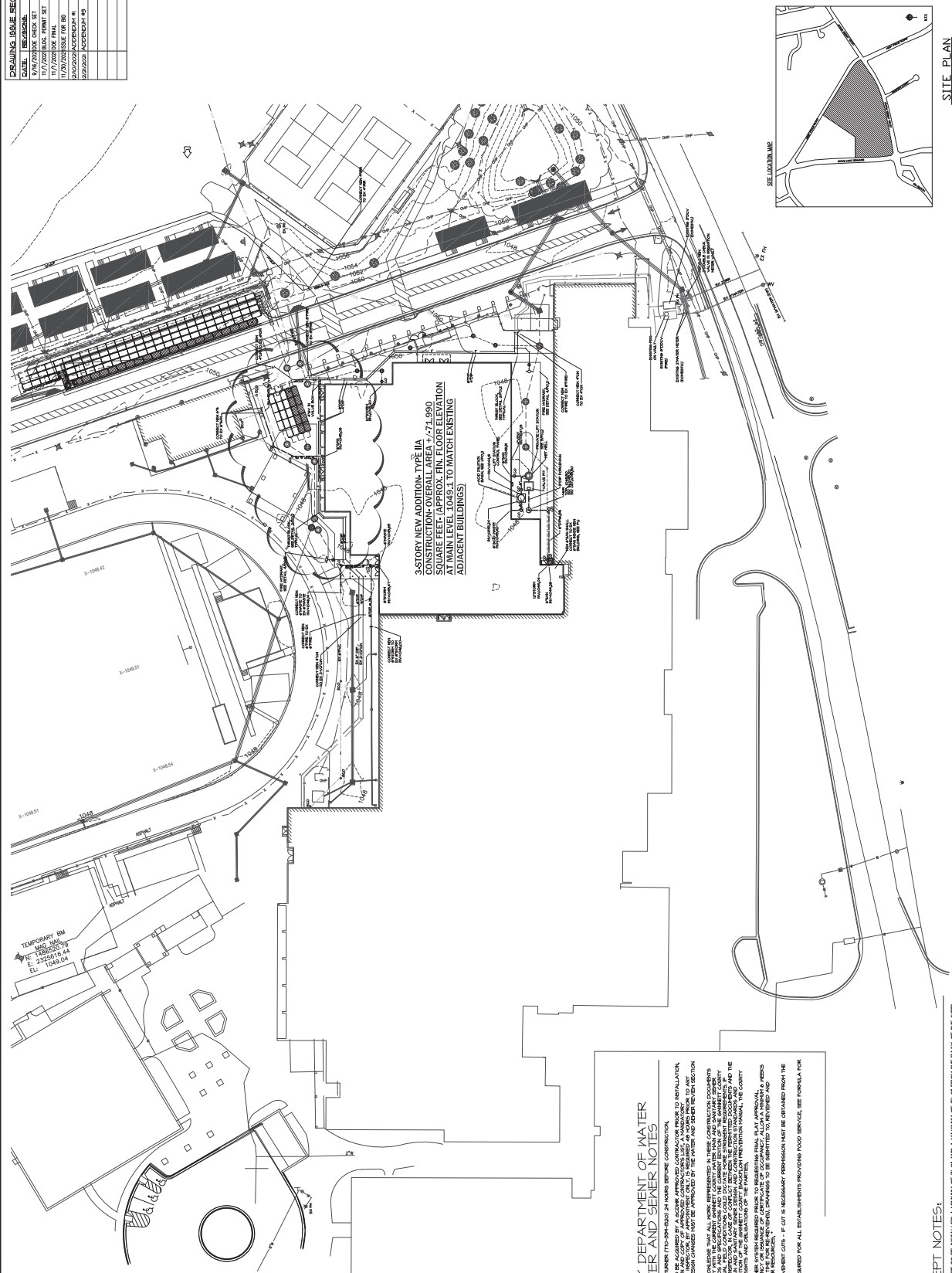


1. OVERALL & ADDITION ROOF PLAN

DATE	REVISION	NO.
9/27/2006	ISSUE RECORD	1
11/7/2006	REVISED CRED SET	2
11/7/2006	REVISED CRED SET	3
11/20/2006	REVISED CRED SET	4
11/20/2006	REVISED CRED SET	5
11/20/2006	REVISED CRED SET	6
11/20/2006	REVISED CRED SET	7
11/20/2006	REVISED CRED SET	8
11/20/2006	REVISED CRED SET	9
11/20/2006	REVISED CRED SET	10
11/20/2006	REVISED CRED SET	11
11/20/2006	REVISED CRED SET	12
11/20/2006	REVISED CRED SET	13
11/20/2006	REVISED CRED SET	14
11/20/2006	REVISED CRED SET	15
11/20/2006	REVISED CRED SET	16
11/20/2006	REVISED CRED SET	17
11/20/2006	REVISED CRED SET	18
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11/20/2006	REVISED CRED SET	97
11/20/2006	REVISED CRED SET	98
11/20/2006	REVISED CRED SET	99
11/20/2006	REVISED CRED SET	100

FACILITY CODE 66T-45B6

DISTRICT 7, LAND LOT 201, PARCEL 015



SITE PLAN KEY PLAN

SPURLOCK & ASSOCIATES, INC.
 consulting engineers, architects, interior designers
 3335 Old Peachtree Road, Suite 100, Atlanta, GA 30328
 P: 404.433.8241 F: 404.433.1714
 www.spurlock.com

IT'S THE LAW!

NO PARKING
NO STOPPING

USE THESE PROHIBITION SYMBOLS FOR ALL SIGNS AND MARKINGS.
 # FOR NO PARKING
 # FOR NO STOPPING

SCALE: 1" = 30'

1 INCH = 30 FT.

PROVIDER:
 SPURLOCK & ASSOCIATES, INC.
 3335 Old Peachtree Road, Suite 100
 Atlanta, GA 30328
 P: 404.433.8241
 F: 404.433.1714
 www.spurlock.com

WATER FLOOR TEST DATA

FLOOR TEST DATE: 07/20/02
 FLOOR: 4th FLOOR
 FLOOR AREA: 62,236.66 SQ. FT.
 PRESSURE: 140 PSI
 FLOW: 4.45 GPM @ 20 P.S.I.
 FLOW: 4.45 GPM @ 20 P.S.I.
 FLOW: 4.45 GPM @ 20 P.S.I.

NOTE: FLOOR TEST ABOVE IS FOR PERMITTING PURPOSE ONLY. SPRINKLER CONTRACTOR SHALL PROVIDE A SEPARATE 24 HOUR FLOOR TEST TO VERIFY FLOOR WATER TIGHTNESS. ALL FLOOR TESTS SHALL MEET THE REQUIRED FLOOR WATER TIGHTNESS. REFER TO THE CODES AND APPROVALS.

GENERAL NOTES:

- CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES OR OMISSIONS OF EXISTING CONDITIONS SHOWN ON PLANS BEFORE WORK IS BEGUN.
- CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL EXISTING UTILITIES BEFORE INSTALLING ANY PIPING.
- INSTALLATION OF EXISTING UTILITIES SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS FOR SUCH UTILITIES.
- INSTALLATION OF NEW UTILITIES SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS FOR SUCH UTILITIES.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF ATLANTA.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE STATE OF GEORGIA.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE FEDERAL GOVERNMENT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNMENT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE ADJACENT PROPERTY OWNERS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE ADJACENT PROPERTY OWNERS.

GWINNETT COUNTY DEPARTMENT OF WATER RESOURCES: WATER AND SEWER NOTES

- GEORGIA DOT RW - CALL COURTESY NUMBER (770) 388-3303 24 HOURS BEFORE CONSTRUCTION.
- UTILITIES CONSTRUCTION PERMITS SHALL BE OBTAINED BY AN APPROVED CONTRACTOR IN ACCORDANCE WITH THE CITY OF ATLANTA UTILITIES DEPARTMENT PERMITS MANUAL. PERMITS SHALL BE OBTAINED PRIOR TO THE START OF CONSTRUCTION AND ALL DESIGN CHANGES MUST BE APPROVED BY THE WATER AND SEWER DEPARTMENT.
- EXISTING UTILITIES SHALL BE IDENTIFIED AND MARKED PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION AND DEPTH OF ALL EXISTING UTILITIES.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF ATLANTA.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE STATE OF GEORGIA.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE FEDERAL GOVERNMENT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNMENT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE ADJACENT PROPERTY OWNERS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE ADJACENT PROPERTY OWNERS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE ADJACENT PROPERTY OWNERS.

FIRE DEPT. NOTES:

- INSTALLATION SHALL BE IN ACCORDANCE WITH THE CITY OF ATLANTA FIRE DEPARTMENT PERMITS MANUAL. PERMITS SHALL BE OBTAINED PRIOR TO THE START OF CONSTRUCTION.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF ATLANTA.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE STATE OF GEORGIA.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE FEDERAL GOVERNMENT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNMENT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE ADJACENT PROPERTY OWNERS.
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- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE ADJACENT PROPERTY OWNERS.

SITE PLUMBING LEGEND

SYMBOL	DESCRIPTION
---○---	SOIL OR WASTE ABOVE SLAB
---○---	SOIL OR WASTE BELOW SLAB OR GRADE
---	COLD WATER PIPING
---	WARM WATER BELOW SLAB OR GRADE
---	COLD PIPING
---	WARM PIPING ABOVE GRADE
---	HIGH PRESSURE GAS PIPING
---	STEAM PIPING
---	CHECK VALVE
---	WASTE VALVE OR BALL VALVE
---	POUR RELIEF VALVE
---	FLOOR DRAIN, UN-RELOCATED TYPE
---	FLOOR DRAIN, RELOCATED TYPE
---	PIPE TURNING UP
---	PIPE TURNING DOWN
---	THE CONNECTION IN TOP OF PIPE
---	WATER
PV1	POUR RELIEF VALVE
RV1	WASTE WATER PIPING
---	PIPE CLEANOUT CONNECTION
---	PIPE CLEANOUT
---	INVERT ELEVATION
---	CLEAN OUT
---	EXISTING CLEAN OUT
---	FLOOR/CEILING FLOOR
---	BELOW GRADE
---	WASTE
---	COLD WATER
---	HEAT EXCHANGER

1 ACID DILUTION BASIN DETAIL
NO SCALE - SCHEMATIC ONLY

2 CONCRETE THRUST BLOCK DETAIL
NO SCALE - SCHEMATIC ONLY

3 SENSAGE LIFT STATION DETAIL
NO SCALE - SCHEMATIC ONLY

4 FIRE HYDRANT INSTALLATION DETAIL
NO SCALE - SCHEMATIC ONLY

DRAWING ISSUE RECORD

DATE	REVISION	NO.
9/17/2016	ISSUE FOR SET	1
11/17/2016	REVISED PER COMMENTS	2
11/20/2016	REVISED FOR 80	3
2/20/2017	REVISED PER COMMENTS	4
2/22/2017	REVISED PER COMMENTS	5

5 NORTH GUINNETT HIGH SCHOOL EAST ADDITION
20 LEVEL CREEK ROAD SUWANEE, GA 30024
GUINNETT COUNTY BOARD OF EDUCATION
GUINNETT COUNTY, GEORGIA

6000
FACILITY CODE 661-4536

3 SITE PLAN - PLUMBING
SCALE: 1" = 30'

CONCRETE THRUST BLOCK DETAIL
NO SCALE - SCHEMATIC ONLY

ACID DILUTION BASIN DETAIL
NO SCALE - SCHEMATIC ONLY

SECTION A*
ELEVATION

BED NO.	THICKNESS	FINISH
1	18"	CONCRETE
2	4"	CONCRETE
3	2"	CONCRETE
4	4"	CONCRETE
5	4"	CONCRETE
6	4"	CONCRETE
7	4"	CONCRETE
8	4"	CONCRETE
9	4"	CONCRETE
10	4"	CONCRETE
11	4"	CONCRETE
12	4"	CONCRETE
13	4"	CONCRETE
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25	4"	CONCRETE
26	4"	CONCRETE
27	4"	CONCRETE
28	4"	CONCRETE
29	4"	CONCRETE
30	4"	CONCRETE

SECTION B*
ELEVATION

SECTION C*
ELEVATION

SECTION D*
ELEVATION

SECTION E*
ELEVATION

SECTION F*
ELEVATION

SECTION G*
ELEVATION

SECTION H*
ELEVATION

SECTION I*
ELEVATION

SECTION J*
ELEVATION

SECTION K*
ELEVATION

SECTION L*
ELEVATION

SECTION M*
ELEVATION

NOTES

1. BOTTOM OF BASIN SHALL HAVE SMOOTH TROUSLED SURFACE FOR THIS SUPPORT
2. CASTING SHALL BE MONITORED BY THE PLUMBING CONTRACTOR AND TESTED BY THE ELECTRICAL CONTRACTOR.
3. COATING FOR BRACKETS, FITTINGS AND VALVE FITS SHALL BE COATED WITH 2-THICKNESS OF PVC.
4. INTERIOR SURFACE OF THE WELLS AND VALVE FITS SHALL BE COATED WITH 200 GRAIN SAND/EPDM LACQUER FOR CORROSION PROTECTION.

NOTES

1. THIS IS TO BE USED FOR THE EXISTING AND NEW PIPING TO BE INSTALLED IN THE RISE AND FALL OF THE SENSAGE LIFT STATION.
2. THE SENSAGE LIFT STATION SHALL BE INSTALLED IN THE RISE AND FALL OF THE SENSAGE LIFT STATION.
3. IF PIPING IS TO BE USED, THE PIPING SHALL BE INSTALLED IN THE RISE AND FALL OF THE SENSAGE LIFT STATION.
4. PLACE GRAVEL TO 4" ABOVE PIPING IN THE RISE AND FALL OF THE SENSAGE LIFT STATION.

NOTES

1. THE HYDRANT SHALL BE INSTALLED IN THE RISE AND FALL OF THE SENSAGE LIFT STATION.
2. THE HYDRANT SHALL BE INSTALLED IN THE RISE AND FALL OF THE SENSAGE LIFT STATION.
3. THE HYDRANT SHALL BE INSTALLED IN THE RISE AND FALL OF THE SENSAGE LIFT STATION.
4. THE HYDRANT SHALL BE INSTALLED IN THE RISE AND FALL OF THE SENSAGE LIFT STATION.



SPURLOCK & ASSOCIATES, INC.
consulting engineers, pc, llc
1935 GUNNERS CREEK DRIVE
FARMINGTON, GA 30804
TEL: 706.353.3414 FAX: 706.353.3415



CONCRETE THRUST BLOCK DETAIL
NO SCALE - SCHEMATIC ONLY

ACID DILUTION BASIN DETAIL
NO SCALE - SCHEMATIC ONLY

SENSAGE LIFT STATION DETAIL
NO SCALE - SCHEMATIC ONLY

FIRE HYDRANT INSTALLATION DETAIL
NO SCALE - SCHEMATIC ONLY

SITE PLAN - PLUMBING
SCALE: 1" = 30'

CONCRETE THRUST BLOCK DETAIL
NO SCALE - SCHEMATIC ONLY

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NO SCALE - SCHEMATIC ONLY

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ACID DILUTION BASIN DETAIL
NO SCALE - SCHEMATIC ONLY

SENSAGE LIFT STATION DETAIL
NO SCALE - SCHEMATIC ONLY

P.0.2

DATE	REVISION	NO.
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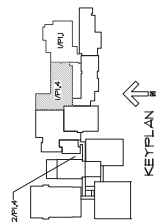
SEE SHEET P1.2 FOR PLUMBING NOTES

1 FIRST FLOOR PARTIAL PLAN - PLUMBING
 1/8" = 1'-0"

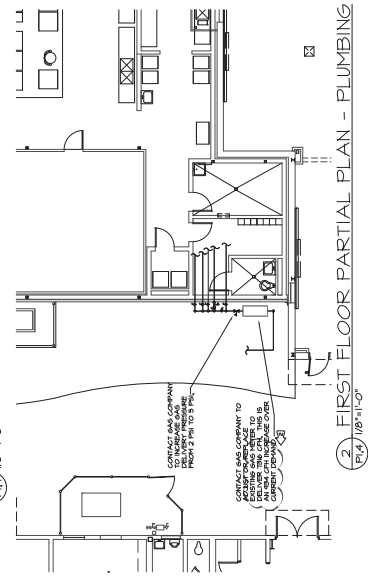
KEY PLAN



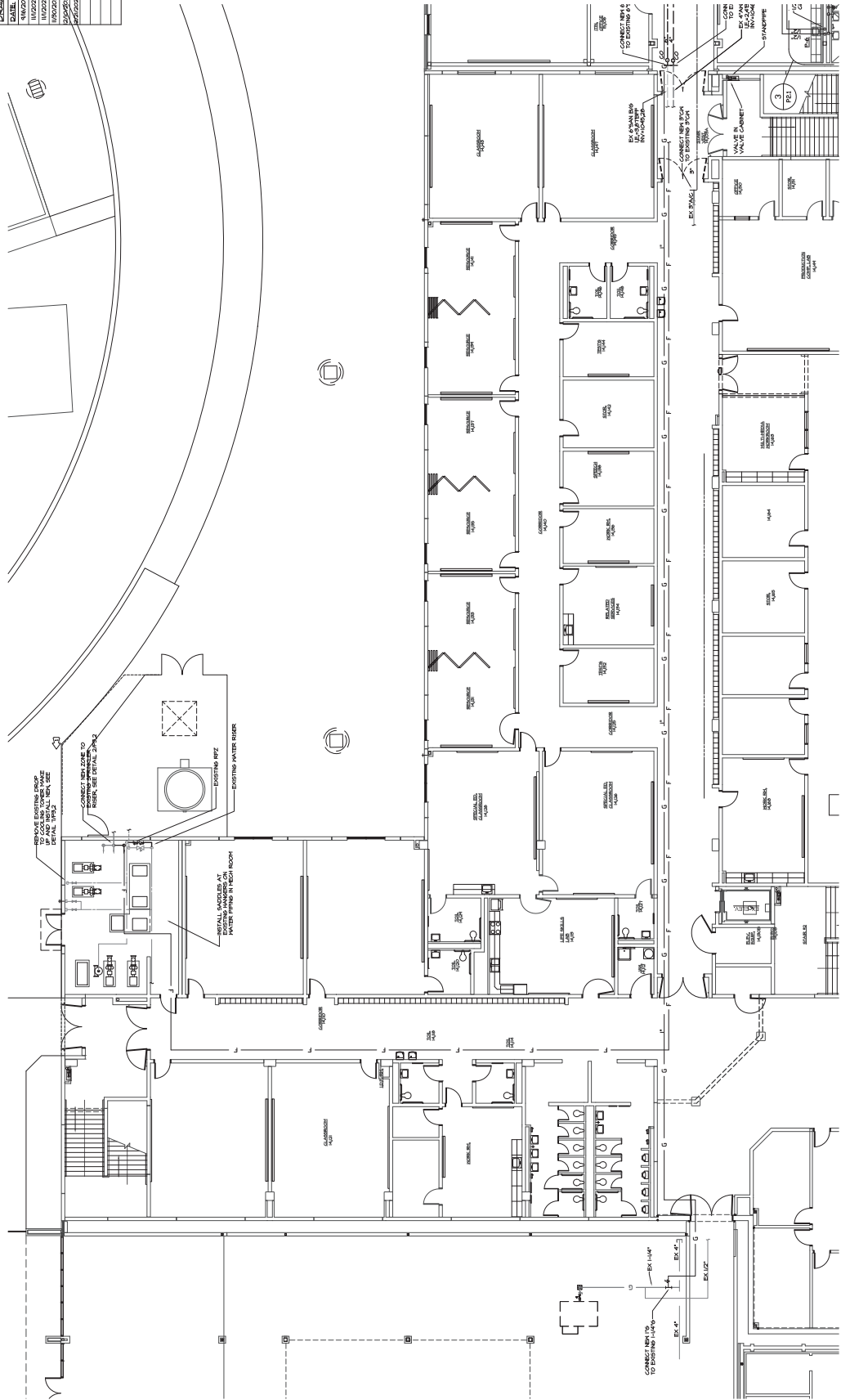
NO SHOOT PENETRATIONS



SEE SHEET P1.2 FOR PLUMBING NOTES



FIRST FLOOR PARTIAL PLAN - PLUMBING
 1/4" = 1'-0"



DATE	REVISION	NO.
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11/10/10	REVISED FOR PERMITS	3
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11/10/10	REVISED FOR PERMITS	9
11/10/10	REVISED FOR PERMITS	10

FACILITY CODE 66T-15B6



DATE: MARCH 1, 2011
 DRAWN BY: JCF
 CHECKED BY: MLD

DATE	REVISION	NO.
11/20/20	1.00	1
11/20/20	2.00	2
11/20/20	3.00	3
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11/20/20	7.00	7
11/20/20	8.00	8
11/20/20	9.00	9
11/20/20	10.00	10

FACILITY CODE 66T-45B6

NORTH GUNNETT HIGH SCHOOL
EAST ADDITION
20 LEVEL CREEK ROAD, SUWANEE, GA 30024
GUNNETT COUNTY BOARD OF EDUCATION
GUNNETT COUNTY, GEORGIA

cunningham fehrnd mathews mae
cunningham, fehrnd, mathews & moore, architects, inc. - 2011 manchester street, n.e. - atlanta, georgia 30324 - phone (404) 873-2152

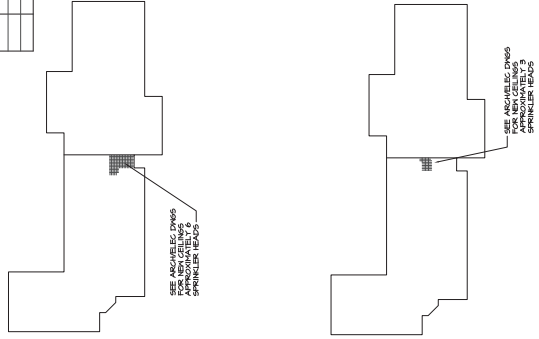
P3.2



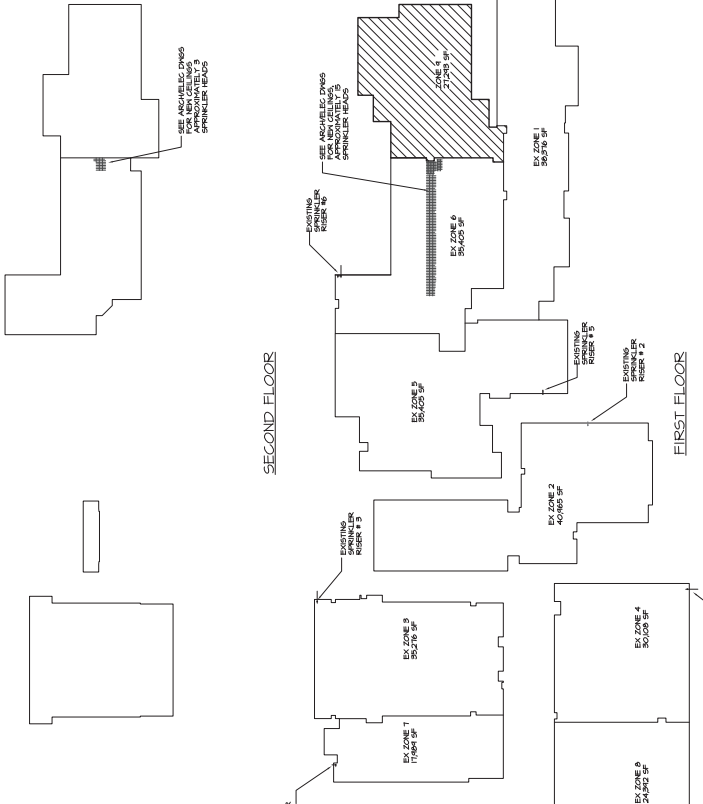
SPRINKLER NOTES:

- CONTRACTOR SHALL RELOCATE ALL EXISTING SPRINKLER PIPING MAINS, BRANCHES, RISERS AND HEADS TO THE NEW WORK AREAS OF THE NEW WAREHOUSE AND THE EXISTING WAREHOUSE. SEE MECHANICAL SHEETS FOR COORDINATION BETWEEN THE TRAVEL IN THE EXISTING WAREHOUSE AND THE NEW WAREHOUSE. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITIONS OF NFPA 13, NFPA 20 AND NFPA 24.
- CONTRACTOR SHALL RELOCATE/REPLACE/REMOVE/REMOVE AND REINSTALL EXISTING SPRINKLER HEADS TO THE NEW WAREHOUSE AND EXISTING WAREHOUSE. SEE MECHANICAL SHEETS FOR COORDINATION BETWEEN THE TRAVEL IN THE EXISTING WAREHOUSE AND THE NEW WAREHOUSE. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITIONS OF NFPA 13, NFPA 20 AND NFPA 24.
- CONTRACTOR SHALL RELOCATE SPRINKLER HEADS TO AVOID LIGHTING FIXTURES, ELECTRICAL PANELS, MECHANICAL EQUIPMENT, AND OTHER OBSTRUCTIONS. SPRINKLER HEADS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITIONS OF NFPA 13, NFPA 20 AND NFPA 24.
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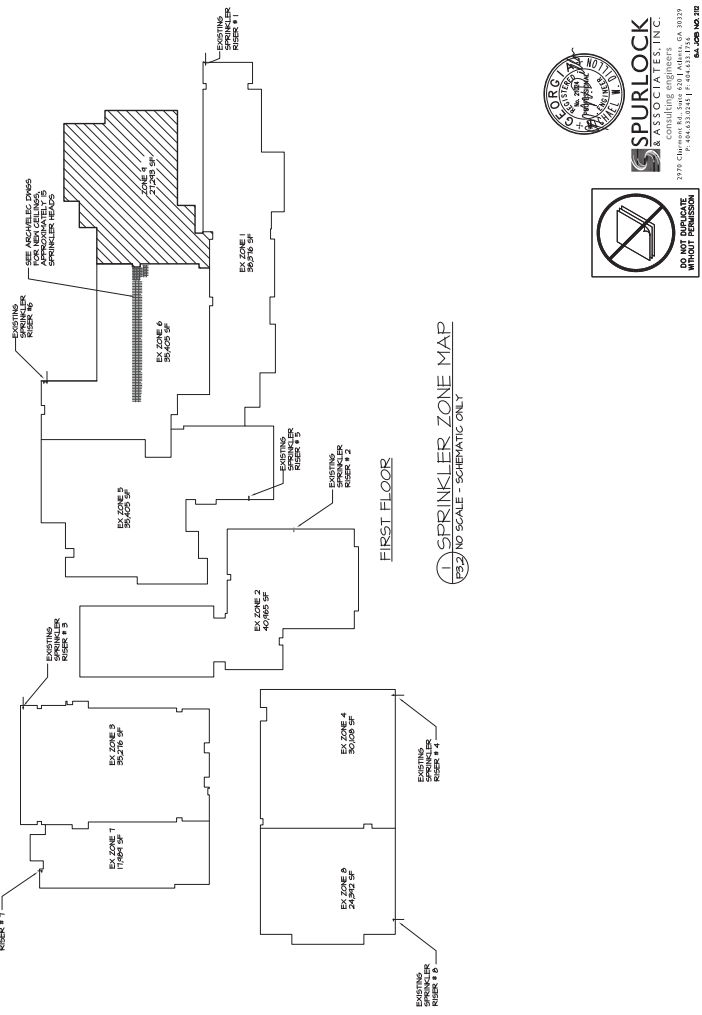
THIRD FLOOR



SECOND FLOOR



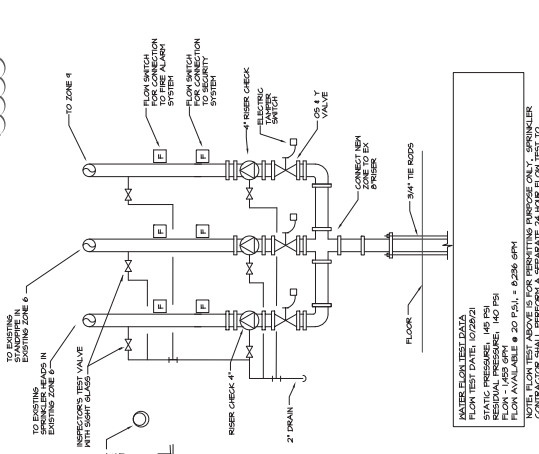
FIRST FLOOR



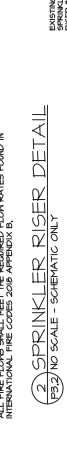
1 SPRINKLER ZONE MAP
P3.2 NO SCALE - SCHEMATIC ONLY

GAS PRESSURE REGULATOR SIZING

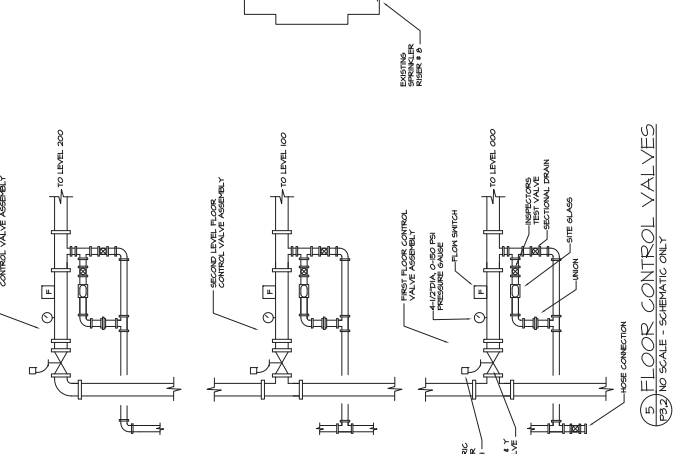
ROOM/NET DEMANDATION	850	845	840	835	830	825	820
GAS LOAD (BTU)	67	100	10	50	10	50	270
SERVICE GAS PRESSURE REG. MODEL #	496	496	496	496	496	496	496
INLET GAS PRESSURE	5.0 PSI	5.0 PSI	5.0 PSI	5.0 PSI	5.0 PSI	5.0 PSI	5.0 PSI
OUTLET GAS PRESSURE	1.1 W.C.	1.1 W.C.	1.1 W.C.	1.1 W.C.	1.1 W.C.	1.1 W.C.	1.1 W.C.



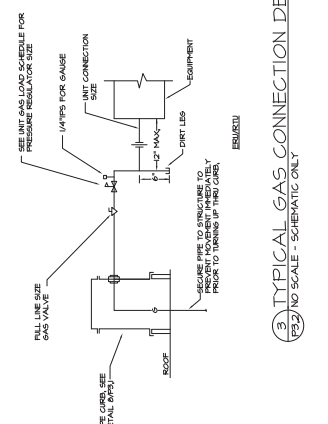
3 TYPICAL GAS CONNECTION DETAIL
P3.2 NO SCALE - SCHEMATIC ONLY



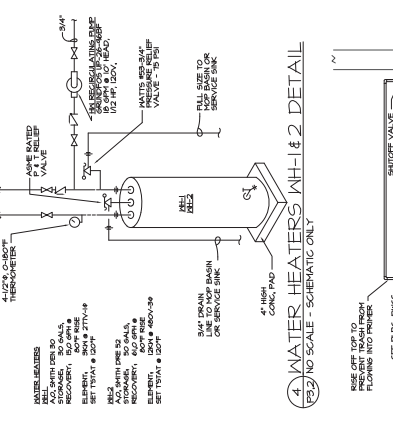
2 SPRINKLER RISER DETAIL
P3.2 NO SCALE - SCHEMATIC ONLY



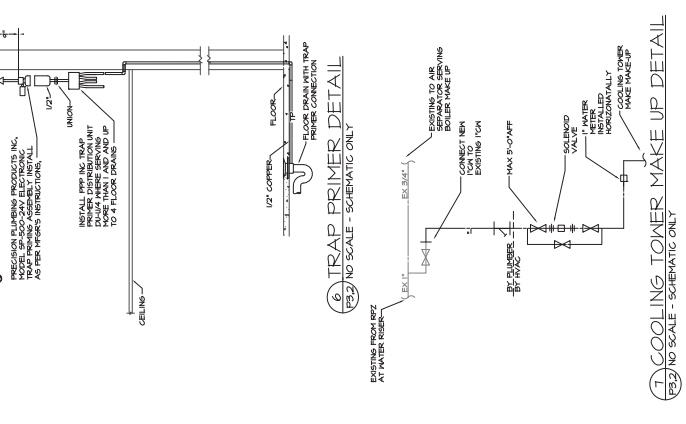
5 FLOOR CONTROL VALVES
P3.2 NO SCALE - SCHEMATIC ONLY



4 WATER HEATERS NH-1 & 2 DETAIL
P3.2 NO SCALE - SCHEMATIC ONLY

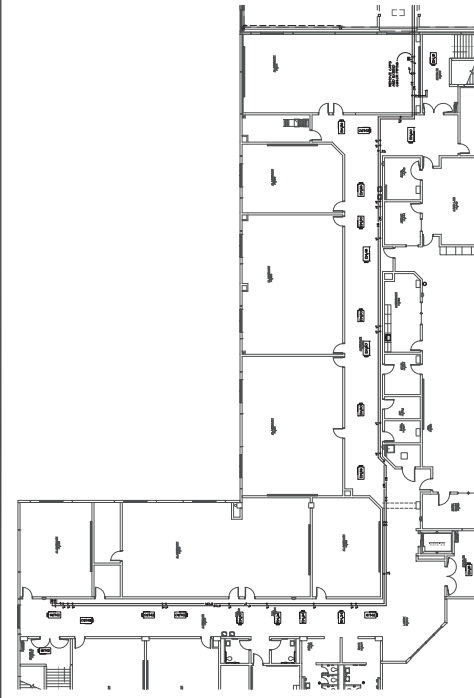


6 TRAP PRIMER DETAIL
P3.2 NO SCALE - SCHEMATIC ONLY

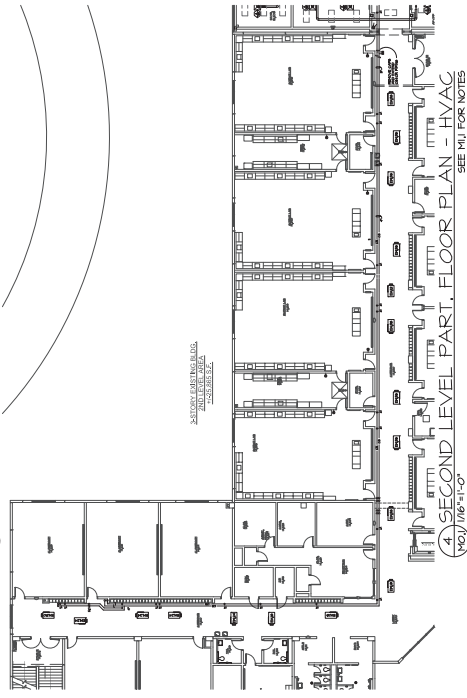


7 COOLING TOWER MAKE UP DETAIL
P3.2 NO SCALE - SCHEMATIC ONLY

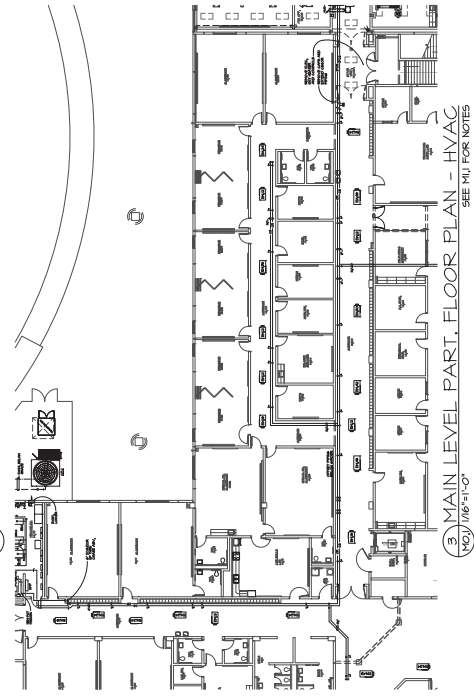




3. THIRD LEVEL PART. FLOOR PLAN - HVAC
SEE MU FOR NOTES



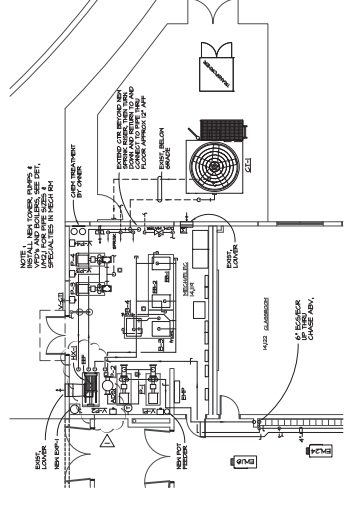
4. SECOND LEVEL PART. FLOOR PLAN - HVAC
SEE MU FOR NOTES



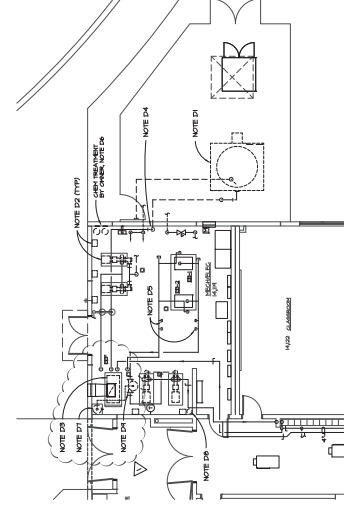
5. MAIN LEVEL PART. FLOOR PLAN - HVAC
SEE MU FOR NOTES

DATE	REVISION	NO.
08/20/2024	ISSUE FOR SET	1
08/20/2024	REVISE PER COMMENTS	2
08/20/2024	REVISE PER COMMENTS	3
08/20/2024	REVISE PER COMMENTS	4
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08/20/2024	REVISE PER COMMENTS	8
08/20/2024	REVISE PER COMMENTS	9
08/20/2024	REVISE PER COMMENTS	10

FACILITY CODE 66T-1596



2. MAIN LEVEL PART. FLOOR PLAN - HVAC
SEE MU FOR NOTES



1. MAIN LEVEL PART. FLOOR PLAN - HVAC DEMO
SEE MU FOR NOTES

GENERAL DEMOLITION NOTES: (MNO) (ONLY)

D1. GENERALLY ITEMS SHOWN DASHED ARE TO BE REMOVED AND ITEMS SHOWN WITH SOLID LINE ARE TO REMAIN.

D2. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D3. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D4. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D5. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D6. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D7. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D8. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D9. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D10. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

DEMOLITION REFERENCE NOTES: (MNO) (ONLY)

D1. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D2. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D3. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D4. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D5. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

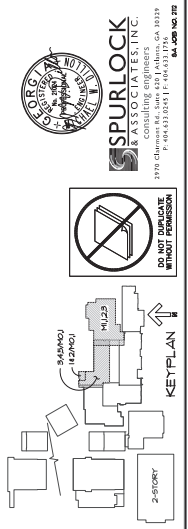
D6. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D7. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D8. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D9. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.

D10. REMOVE EXISTING AIR HAND UNITS, FAN COILS, VAVS, ETC. AS SHOWN.



SPURLOCK & ASSOCIATES, INC.
CONSULTING ENGINEERS
11700 DALY ROAD, SUITE 100
FARMERS BRANCH, GA 30204
PH: 404-313-8141 FAX: 404-313-8142

NORTH GWINNETT HIGH SCHOOL
EAST ADDITION
 20 LEVEL CREEK ROAD, GAINESVILLE, GA 30224
 GWINNETT COUNTY BOARD OF EDUCATION
 GWINNETT COUNTY, GEORGIA

DATE	REVISION	NO.
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08/20/2010	ISSUE FOR PERMIT SET	2
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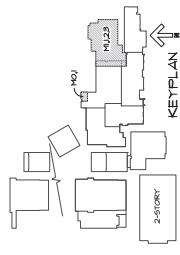
FACILITY CODE 66T-4596

GENERAL NOTES: (ALL SHEETS)

1. CONTRACTOR SHALL NOTIFY ENGINEER IN WRITING OF ANY DISCREPANCIES OF INFORMATION PROVIDED TO BE INSTALLED AS SHOWN ON PLANS BEFORE WORK IS BEGUN.
2. ALL PENETRATIONS THROUGH FLOOR SLABS SHALL BE PROTECTED WITH AN APPROVED FLOOR PROTECTION SYSTEM. THE PROTECTION SHALL BE INSTALLED WITHIN THE PROPOSED FLOOR SLAB BEFORE ANY PENETRATIONS ARE MADE.
3. ALL PENETRATIONS THROUGH FLOOR SLABS SHALL BE PROTECTED WITH AN APPROVED FLOOR PROTECTION SYSTEM. THE PROTECTION SHALL BE INSTALLED WITHIN THE PROPOSED FLOOR SLAB BEFORE ANY PENETRATIONS ARE MADE.
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5. THESE NOTES SHALL BE INSTALLED AS SHOWN ON PLANS BEFORE WORK IS BEGUN.
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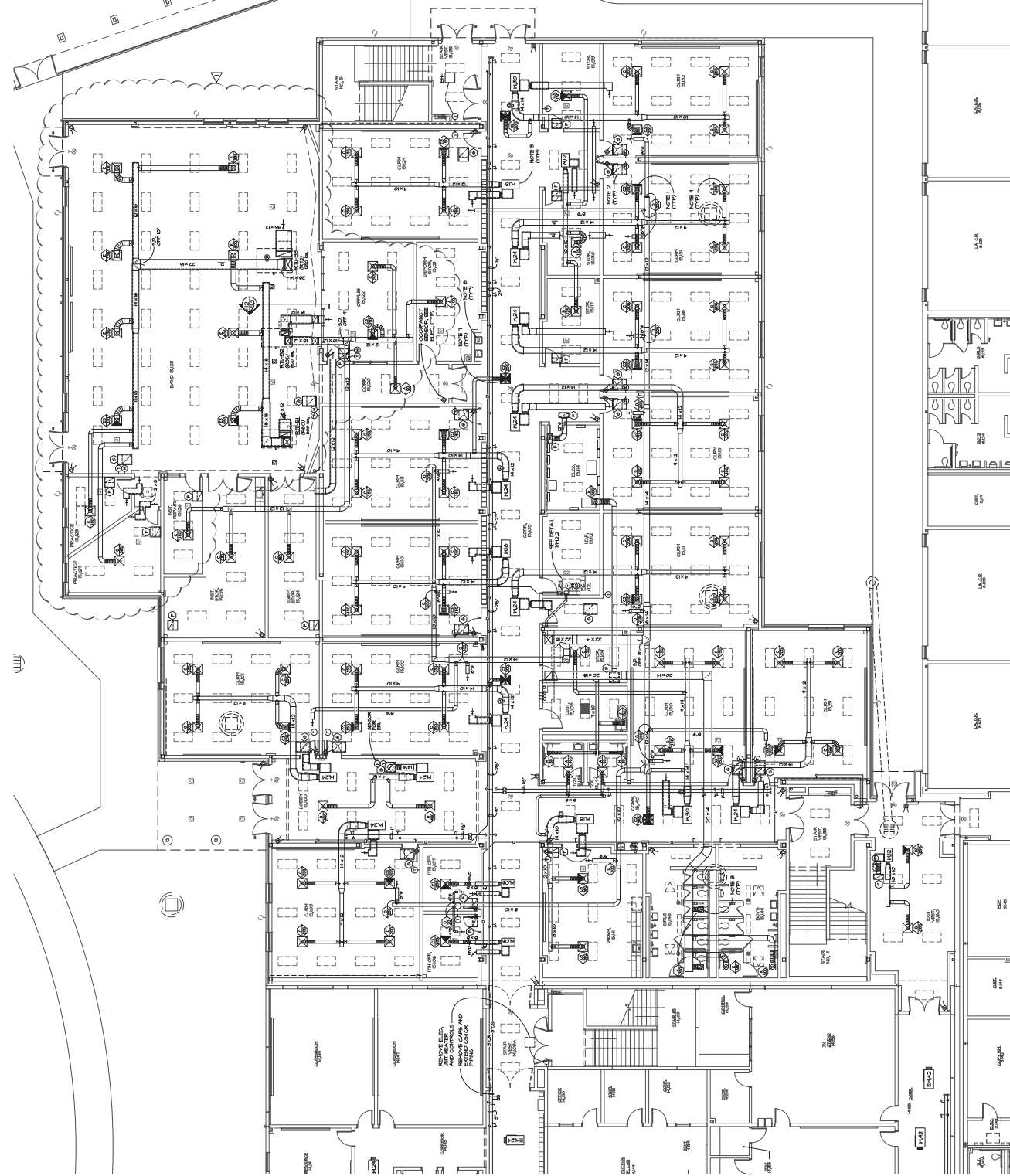
REFERENCED NOTES: (ALL SHEETS)

1. SEE ELECTRICAL DRAWINGS FOR FINISHES OF WORK AND ALTERNATES.
2. SEE ELECTRICAL DRAWINGS FOR FINISHES OF WORK AND ALTERNATES.
3. SEE ELECTRICAL DRAWINGS FOR FINISHES OF WORK AND ALTERNATES.
4. SEE ELECTRICAL DRAWINGS FOR FINISHES OF WORK AND ALTERNATES.
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18. SEE ELECTRICAL DRAWINGS FOR FINISHES OF WORK AND ALTERNATES.
19. SEE ELECTRICAL DRAWINGS FOR FINISHES OF WORK AND ALTERNATES.
20. SEE ELECTRICAL DRAWINGS FOR FINISHES OF WORK AND ALTERNATES.





SPURLUCK & ASSOCIATES, INC.
 consulting engineers, architects, interior designers
 11700 Peachtree Dunwoody Road, Suite 100
 Atlanta, Georgia 30338
 Phone: (404) 433-1176
 Fax: (404) 433-1177
 www.spurluck.com



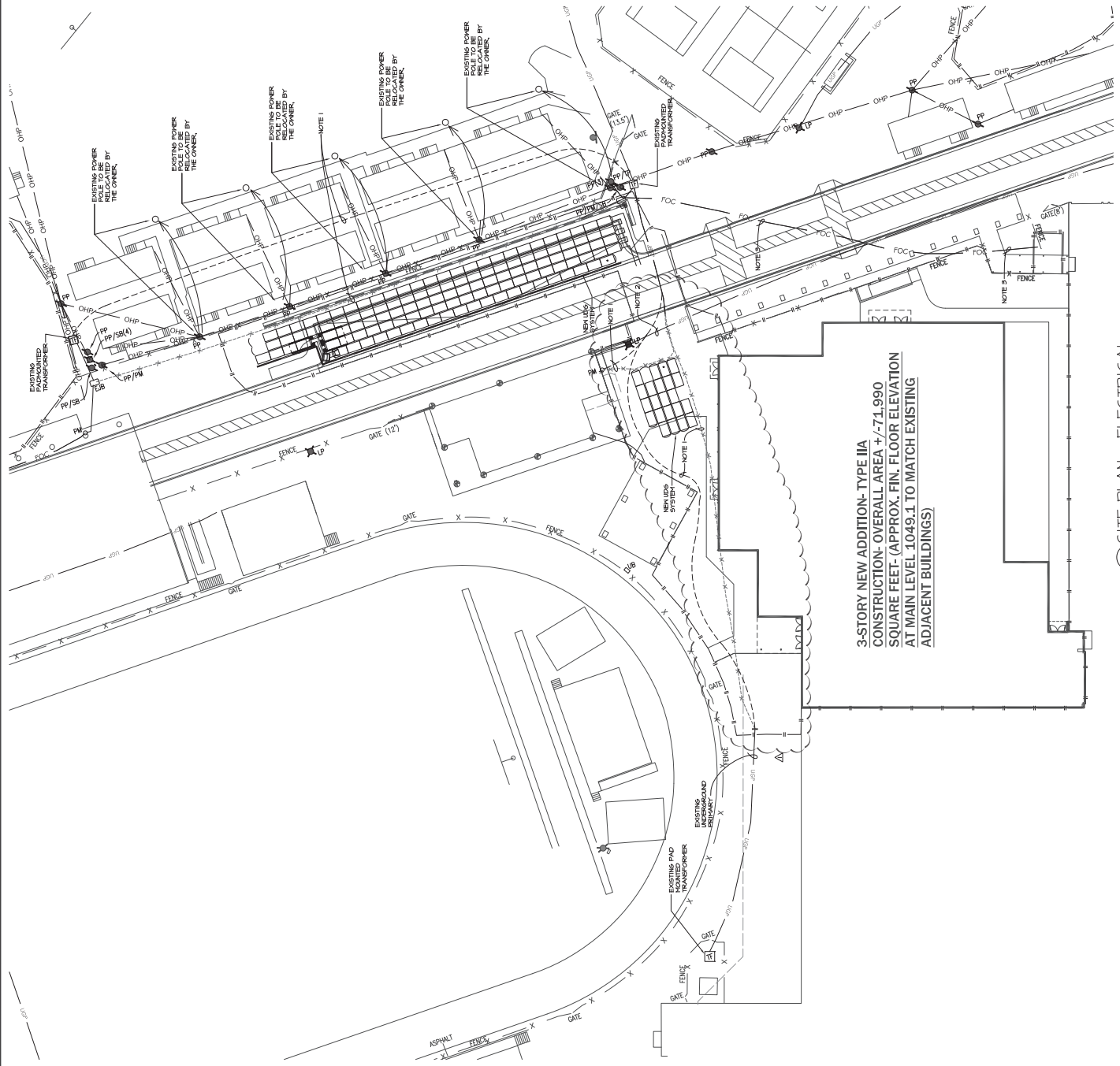
(11) 1/8" = 1'-0"
MAIN LEVEL ADDITION FLOOR PLAN - HVAC

Cunningham Federal Matthews Moore

Cunningham, Forehand, Matthews & Moore, Architects, Inc. - 2011 Manchester Street, N.E. - Atlanta, Georgia 30324 - Phone (404) 873-2152
 20 LEVEL CREEK ROAD, SUWANEE, GA 30024
 EAST ADDITION
 NORTH GWINNETT HIGH SCHOOL
 GWINNETT COUNTY BOARD OF EDUCATION
 GWINNETT COUNTY, GEORGIA

FACILITY CODE 66T-1596

DATE	REVISIONS	NO.
02/02/2011	ISSUE FOR PERMITS	1
02/02/2011	ISSUE FOR BIDDING	2
02/02/2011	ISSUE FOR CONSTRUCTION	3
02/02/2011	ISSUE FOR RECORD SET	4
02/02/2011	ISSUE FOR FINALS	5
02/02/2011	ISSUE FOR AS-BUILT	6



- REFERENCED NOTES: (APPLIES SHEETS E-01)**
- CONTRACTOR TO COORDINATE WITH THE SERVICE PROVIDER COMPANY TO VERIFY THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES TO AVOID NEW UNDERGROUND DRAINAGE SYSTEM.
 - CONTRACTOR TO DISCONNECT EXISTING UNDERGROUND POWER AND GROUNDING SYSTEMS TO BE REMOVED AND RECONNECT AFTER OTHER GRADED DRAINAGE SYSTEM IS INSTALLED.
 - REMOVE AND SAVE EXISTING UNDERGROUND FIBER OPTIC CABLE FOR REUSE.

PERMITTER:
 GWINNETT COUNTY PUBLIC WORKS
 1000 GWINNETT COUNTY CENTER
 LAWRENCEVILLE, GA 30046
 PHONE: 770-882-2100
 FAX: 770-882-2100
 WWW.GWINNETTGA.GOV

FOR THE OWNER:
 SPURLOCK & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 1370 DUNWOODY ROAD, SUITE 100
 DUNWOODY, GA 30329
 PHONE: 404-433-1176
 FAX: 404-433-1176
 WWW.SPURLOCK-AND-ASSOCIATES.COM

DATE OF PERMIT: 02/02/2011
DATE OF REVIEW: 02/02/2011
DATE OF AS-BUILT: 02/02/2011
DATE OF RECORD SET: 02/02/2011
DATE OF FINALS: 02/02/2011
DATE OF AS-BUILT: 02/02/2011

IT'S THE WAY WE LIVE!

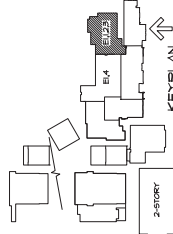


E0.1 SITE PLAN - ELECTRICAL
 E0.1/11-20-0

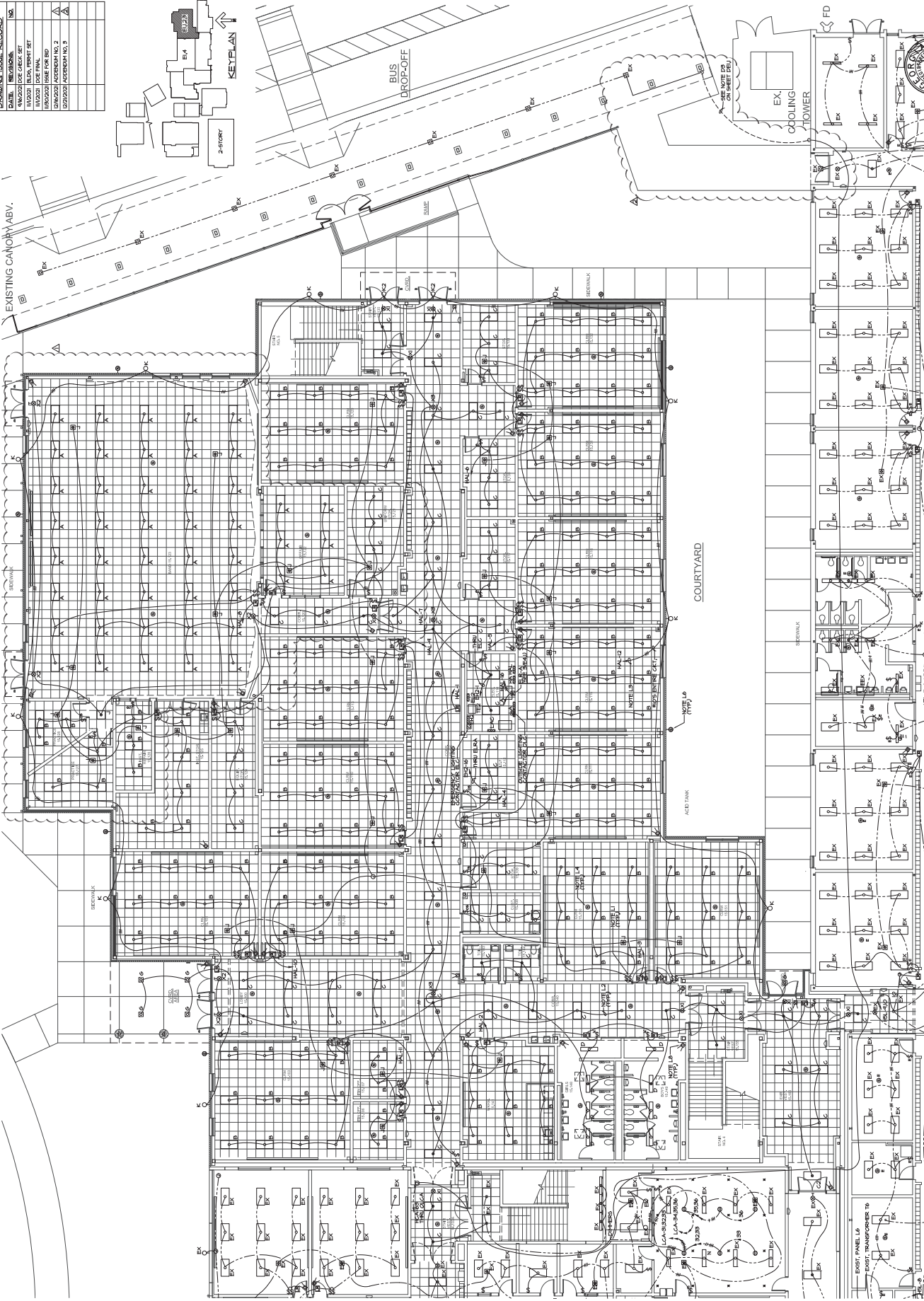
NORTH GWINNETT HIGH SCHOOL EAST ADDITION 20 LEVEL CREEK ROAD, GAINESVILLE, GA 30224

FACILITY CODE 66T-45B6

Table with columns: DATE, DRAWING, REVISION, NO. It lists various drawing revisions for the lighting plan.



EXISTING CANOPY ABV.



MAIN LEVEL ADDITION FLOOR PLAN - LIGHTING

E1-107-1-07

REFERENCED LIGHTING NOTES:

- 1. ALL LIGHTING FIXTURES SHALL BE ABOVE HUNG UNITS AND OUT OF REACH ACCESS.
2. BREAK CONTRACTORS TO EXTERIOR LIGHTING THROUGH PROVIDE ONE SEPARATE CONTRACTOR TO LIGHTING THROUGH RELAY AT BUS CANOPY BRIDGE.
3. BREAK CONTRACTORS TO EXTERIOR LIGHTING THROUGH RELAY AT BUS CANOPY BRIDGE.
4. BREAK CONTRACTORS TO EXTERIOR LIGHTING THROUGH RELAY AT BUS CANOPY BRIDGE.
5. BREAK CONTRACTORS TO EXTERIOR LIGHTING THROUGH RELAY AT BUS CANOPY BRIDGE.
6. BREAK CONTRACTORS TO EXTERIOR LIGHTING THROUGH RELAY AT BUS CANOPY BRIDGE.

REFERENCED LIGHTING NOTES:

- 1. NETWORK WALL MOUNTED SPEAKERS ARE SHOWN ON THIS DRAWING FOR LOCATION. CONTRACTOR SHALL PROVIDE THE NETWORK WALL MOUNTED SPEAKERS AND PROVIDE THE NETWORK WALL MOUNTED SPEAKERS TO THE NETWORK WALL CONTRACTOR.
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3. NETWORK WALL MOUNTED SPEAKERS ARE SHOWN ON THIS DRAWING FOR LOCATION. CONTRACTOR SHALL PROVIDE THE NETWORK WALL MOUNTED SPEAKERS AND PROVIDE THE NETWORK WALL MOUNTED SPEAKERS TO THE NETWORK WALL CONTRACTOR.

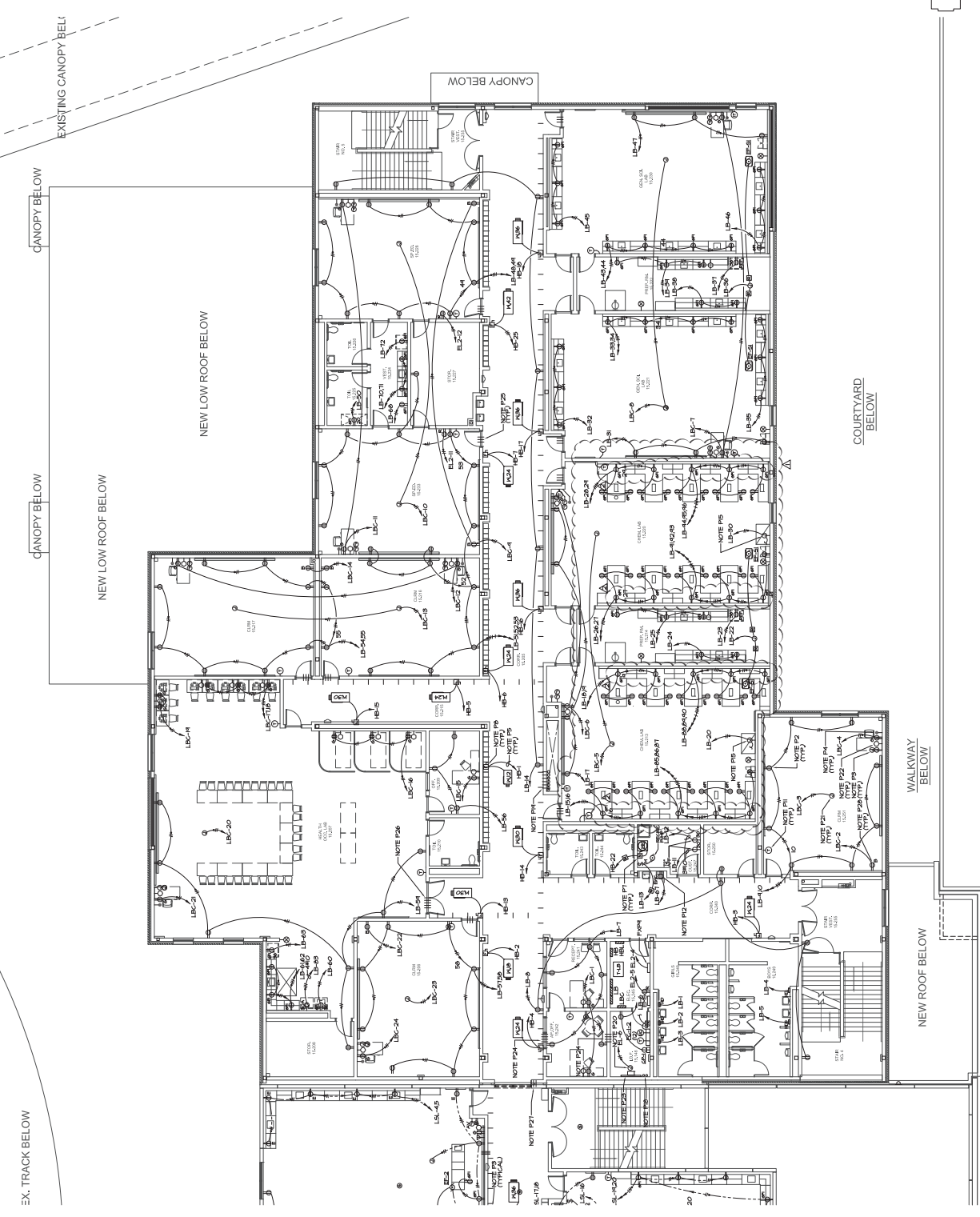


SPURLOCK & ASSOCIATES, INC. CONSULTING ENGINEERS

1570 OLD BRIDGE ROAD, SUITE 300, GAINESVILLE, GA 30606

DATE	REVISIONS	NO.
10/20/2010	PROPOSED CHECK SET	1
11/02/2010	REVISED CHECK SET	2
11/02/2010	REVISED CHECK SET	3
11/02/2010	REVISED CHECK SET	4
11/02/2010	REVISED CHECK SET	5
11/02/2010	REVISED CHECK SET	6
11/02/2010	REVISED CHECK SET	7
11/02/2010	REVISED CHECK SET	8
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11/02/2010	REVISED CHECK SET	99
11/02/2010	REVISED CHECK SET	100

FACILITY CODE 66T-1596



1 SECOND LEVEL ADDITION FLOOR PLAN - POWER
 E2.2 1/8"=1'-0"

SEE SHEET E2.1 FOR REFERENCED POWER NOTES.



SPURLOCK & ASSOCIATES, INC.
 CONSULTING ENGINEERS, ARCHITECTS, INTERIORS
 11700 DOW ROAD, SUWANEE, GA 30024
 P: 404.833.8241 F: 404.833.1174
 www.spurlock.com

NO SMOKING

DRAWING ISSUE RECORD table with columns for DATE, REVISION, and DESCRIPTION.

Facility Code 667-4596 table with columns for CODE, DESCRIPTION, and QUANTITY.

PANEL HA MAIN 225A-3P MAIN BREAKER PANEL A.G. 2000A. Table listing electrical components like RECEPTS, LIGHTS, and SPARE.

PANEL HA1 MAIN 225A-3P MAIN BREAKER PANEL A.G. 2000A. Table listing electrical components like RECEPTS, LIGHTS, and SPARE.

PANEL LA MAIN 225A-3P MAIN BREAKER PANEL A.G. 2000A. Table listing electrical components like RECEPTS, LIGHTS, and SPARE.

PANEL LA1 MAIN 225A-3P MAIN BREAKER PANEL A.G. 2000A. Table listing electrical components like RECEPTS, LIGHTS, and SPARE.

PANEL HB MAIN 225A-3P MAIN BREAKER PANEL A.G. 2000A. Table listing electrical components like RECEPTS, LIGHTS, and SPARE.

PANEL HB1 MAIN 225A-3P MAIN BREAKER PANEL A.G. 2000A. Table listing electrical components like RECEPTS, LIGHTS, and SPARE.

PANEL LB MAIN 225A-3P MAIN BREAKER PANEL A.G. 2000A. Table listing electrical components like RECEPTS, LIGHTS, and SPARE.

PANEL LB1 MAIN 225A-3P MAIN BREAKER PANEL A.G. 2000A. Table listing electrical components like RECEPTS, LIGHTS, and SPARE.

PANEL LC MAIN 225A-3P MAIN BREAKER PANEL A.G. 2000A. Table listing electrical components like RECEPTS, LIGHTS, and SPARE.

PANEL LC1 MAIN 225A-3P MAIN BREAKER PANEL A.G. 2000A. Table listing electrical components like RECEPTS, LIGHTS, and SPARE.

PANEL LBC MAIN 225A-3P MAIN BREAKER PANEL A.G. 2000A. Table listing electrical components like RECEPTS, LIGHTS, and SPARE.

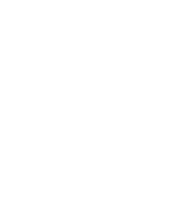
PANEL LBC1 MAIN 225A-3P MAIN BREAKER PANEL A.G. 2000A. Table listing electrical components like RECEPTS, LIGHTS, and SPARE.

PANEL BOARD NOTES: 1. ALL 2000A BRANCH CIRCUIT PANELS SHALL BE THE A.C. 2. BRANCH CIRCUIT BREAKERS SHALL BE VERTICALLY MOUNTED AND...

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TO

PLANS AND SPECIFICATIONS

FOR CONSTRUCTION OF

NORTH GWINNETT HIGH SCHOOL

EAST ADDITION

FOR

GWINNETT COUNTY BOARD OF EDUCATION
GWINNETT COUNTY, GA

DATED: MARCH 1, 2021

SHL-D01-21

CUNNINGHAM FOREHAND MATTHEWS & MOORE, ARCHITECTS, INC.
2011 MANCHESTER STREET, N. E.
ATLANTA, GEORGIA 30324
(404) 873-2152

The following items shall take precedence over the plans and specifications (Project Manual) for the above named project and shall become a part of the Contract Documents.

Where any items called for in the specifications or indicated on the drawings are supplemented hereby, the original shall remain in effect.

Where any original item is amended, voided, or superseded hereby, the provisions of such item not specifically amended voided, or superseded shall remain in effect.

The following items shall be incorporated in the Plans and Project Manual.

A. PROJECT MANUAL:

ITEM NO. 1: SECTION BDI, INSTRUCTIONS TO BIDDERS:

At PROPOSALS: at "Bid on Addition and Renovation..." change to read "Bid on East Addition to North Gwinnett High School."

ITEM NO. 2: SECTION 042000, UNIT MASONRY:

At PART 2 - PRODUCTS, BRICK, at "Face brick shall match existing..." change "Norman" to "modular".

ITEM NO. 3: SECTION 108000, TOILET ACCESSORIES:

At PART 2 - PRODUCTS, PRODUCTS, at "Hand Dryer:"

- a. Change the model number from "XM5-974" to "XM5-0974A."
- b. Delete paragraph that begins "General Contractor Note:."

B. DRAWINGS:ITEM NO. 1: DRAWING CS:

Replace drawing with revised drawing attached herein.

ITEM NO. 2: DRAWING S0.4:

Replace drawing with revised drawing attached herein.

ITEM NO. 3: DRAWING S0.5:

Replace drawing with revised drawing attached herein.

ITEM NO. 4: DRAWING S1.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 5: DRAWING S1.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 6: DRAWING S2.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 7: DRAWING S2.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 8: DRAWING S2.3:

Replace drawing with revised drawing attached herein.

ITEM NO. 9: DRAWING S2.4:

Replace drawing with revised drawing attached herein.

ITEM NO. 10: DRAWING S4.3:

Replace drawing with revised drawing attached herein.

ITEM NO. 11: DRAWING S5.4:

Replace drawing with revised drawing attached herein.

ITEM NO. 12: DRAWING S6.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 13: DRAWING S6.4:

Replace drawing with revised drawing attached herein.

ITEM NO. 14: DRAWING F1.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 15: DRAWING F1.3:

Replace drawing with revised drawing attached herein.

ITEM NO. 16: DRAWING D1.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 17: DRAWING A1.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 18: DRAWING A1.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 19: DRAWING A2.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 20: DRAWING A2.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 21: DRAWING A2.4:

Replace drawing with revised drawing attached herein.

ITEM NO. 22: DRAWING A2.5:

Replace drawing with revised drawing attached herein.

ITEM NO. 23: DRAWING A3.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 24: DRAWING A5.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 25: DRAWING A5.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 26: DRAWING A7.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 27: DRAWING A7.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 28: DRAWING A7.4:

Replace drawing with revised drawing attached herein.

ITEM NO. 29: DRAWING A9.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 30: DRAWING E1.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 31: DRAWING E2.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 32: DRAWING E2.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 33: DRAWING E3.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 34: DRAWING E4.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 35: DRAWING E4.3:

Replace drawing with revised drawing attached herein.

ITEM NO. 36: DRAWING L1.0:

Replace drawing with revised drawing attached herein.

ITEM NO. 37: DRAWING L3.0:

Replace drawing with revised drawing attached herein.

C. PRODUCT AND/OR MANUFACTURER APPROVAL:

None this addendum.

COMPONENTS & CLADDING EXTERNAL PRESSURE LOADS (PSF)

WIND SPEED: 130 MPH (33 M/S) AT 33 FT (10.1 M) AS PER ASCE 7-10

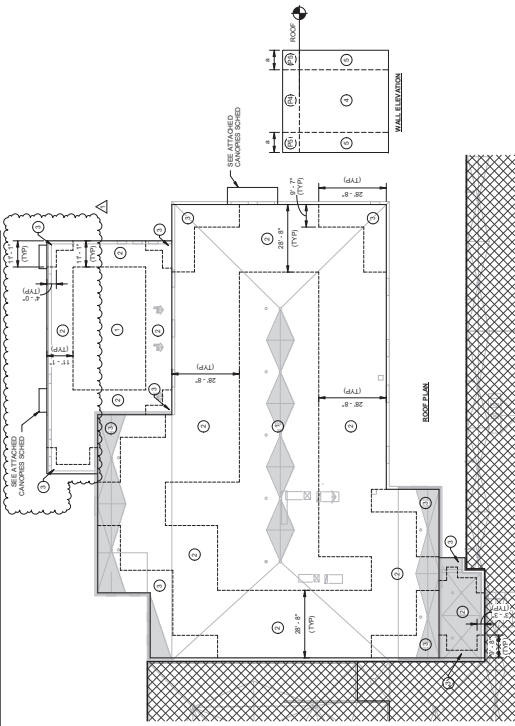
EFFECTIVE WIND AREA (EA)	ROOF OVERLAYS			WALLS			PRESSURES
	1	2	3	1	2	3	
100	10.0	10.0	10.0	15.0	15.0	15.0	15.0
200	10.0	10.0	10.0	15.0	15.0	15.0	15.0
300	10.0	10.0	10.0	15.0	15.0	15.0	15.0
400	10.0	10.0	10.0	15.0	15.0	15.0	15.0
500	10.0	10.0	10.0	15.0	15.0	15.0	15.0
600	10.0	10.0	10.0	15.0	15.0	15.0	15.0
700	10.0	10.0	10.0	15.0	15.0	15.0	15.0
800	10.0	10.0	10.0	15.0	15.0	15.0	15.0
900	10.0	10.0	10.0	15.0	15.0	15.0	15.0
1000	10.0	10.0	10.0	15.0	15.0	15.0	15.0

COMPONENTS & CLADDING EXTERNAL PRESSURE LOADS (PSF) (ATTACHED CANOPIES)

EFFECTIVE WIND AREA (EA)	ROOF OVERLAYS		WALLS		PRESSURES
	1	2	1	2	
100	10.0	10.0	15.0	15.0	15.0
200	10.0	10.0	15.0	15.0	15.0
300	10.0	10.0	15.0	15.0	15.0
400	10.0	10.0	15.0	15.0	15.0
500	10.0	10.0	15.0	15.0	15.0
600	10.0	10.0	15.0	15.0	15.0
700	10.0	10.0	15.0	15.0	15.0
800	10.0	10.0	15.0	15.0	15.0
900	10.0	10.0	15.0	15.0	15.0
1000	10.0	10.0	15.0	15.0	15.0

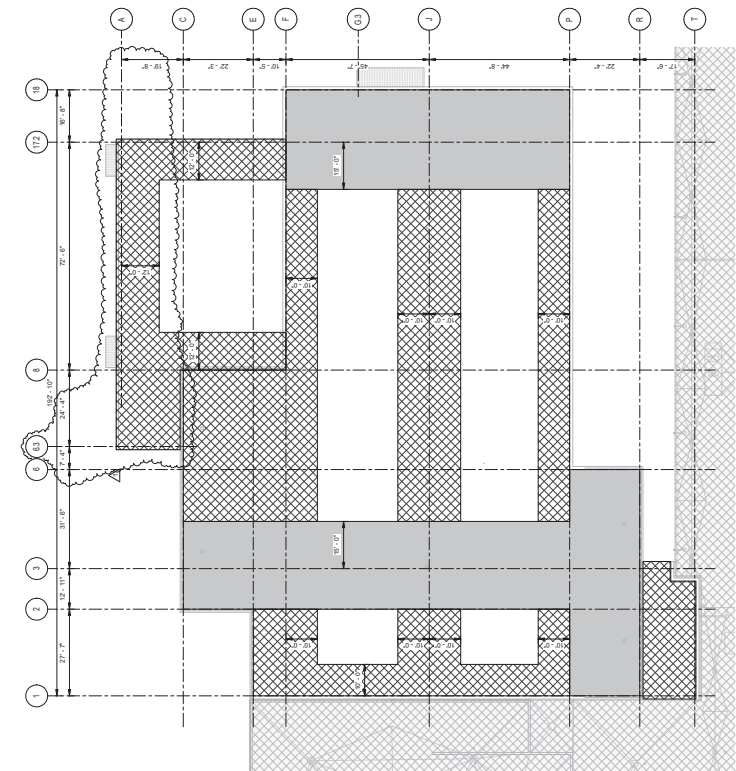
NOTES:

1. 1/2" USE ASSOCIATED ROOF RAMP FOR LOCATION OF ZONES, WALL & ZONE LOCATIONS TO MATCH ROOF FINISH.
2. REFLECT TO ZONES ACTING AGAINST BUILDING OR COMPONENT FACE. NEGATIVE PRESSURE VALUES ARE TO BE APPLIED TO THE SHADING OR PANELING AND ITS CONNECTION ON ROOF SIDE FACE.
3. EACH COMPONENT AND ITS CONNECTION SHALL BE DESIGNED FOR MAXIMUM POSITIVE AND NEGATIVE FORCES.
4. FOR COMPONENTS HAVING EFFECTIVE AREAS BETWEEN TABULATED WALLS DESIGN LOADS MAY BE INTERPOLATED. OTHERWISE DESIGN LOADS SHALL BE TAKEN FROM THE NEXT HIGHER TABULATED SPEED WIND.
5. USE WIND SPEEDS LISTED AS DESIGN WIND SPEEDS FOR ALL APPLICABLE LOAD COMBINATIONS.
6. PARAPET COMPONENTS AND CLADDING ARE THOSE ELEMENTS WHICH EXIST ABOVE THE HORIZONTAL PLANE OF THE ROOF AND SHALL BE DESIGNED FOR:
 - POSITIVE AND NEGATIVE PRESSURES AS APPLIED TO THE SHADING OR PANELING AND ITS CONNECTION ON OUTSIDE FACE.
 - POSITIVE PRESSURES AS APPLIED TO THE SHADING OR PANELING AND ITS CONNECTION ON ROOF SIDE FACE.
 - NEGATIVE PRESSURES AS APPLIED TO THE SHADING OR PANELING AND ITS CONNECTION ON ROOF SIDE FACE.
7. PARAS SHALL BE APPLIED TO THE DESIGN OF THE STRUCTURAL ELEMENT OF THE PARAPET AND ITS CONNECTION, INCLUDING BUT NOT LIMITED TO THE STAIRWAYS OF THE PARAPET.
8. ROOF, DOWN SLOPE DESIGN WIND PRESSURE VALUES WHICH SHALL BE APPLIED AT ROOF OVERHANGS TO TOP SURFACE CLADDING OR WALL PRESSURE. A COMBINATION OF THESE FORCES SHALL BE APPLIED TO THE STRUCTURAL ELEMENT OF THE DOWNHANG AND ITS CONNECTION, INCLUDING BUT NOT LIMITED TO THE STAIRWAYS OF THE DOWNHANG.



COMPONENTS & CLADDING ROOF PLAN
SCALE: 3/8" = 1'-0"

STEEL ROOF DECK ATTACHMENT PATTERN PLAN
SCALE: 1/8" = 1'-0"



- NOTES:**
1. BARE ATTACHMENT IS SET ON PUDDLE WELDS WITH 100% OVERLAP.
 2. BARE ATTACHMENT IS SET ON PUDDLE WELDS WITH 100% OVERLAP.
 3. DENOTES 2x GAL DECK, 30\"/>

NORTH GWINNETT HIGH SCHOOL
EAST ADDITION
20 LEVEL CREEK ROAD, SUWANEE, GA 30024
GWINNETT COUNTY BOARD OF EDUCATION
GWINNETT COUNTY, GEORGIA

FACILITY CODE 687-4598

cunningham forhand mathews moore
cunningham, forhand, mathews & moore, architects, inc. - 2011 manchester street, n.e. - atlanta, georgia 30324 - phone (404) 873-2152



PES STRUCTURAL ENGINEERS
ADDRESS: 1000 CANTON ROAD, SUWANEE, GA 30024
PES PROJECT NUMBER: 021114
PES EXAMINATION DATE: 02/04/22

DRAWING ISSUE RECORD

DATE	REVISIONS	BY	CHK
11/17/2021	ISSUE FOR PERMITS	MM	MM
11/17/2021	ISSUE FOR PERMITS	MM	MM
12/15/21	AS SHOWN	MM	MM

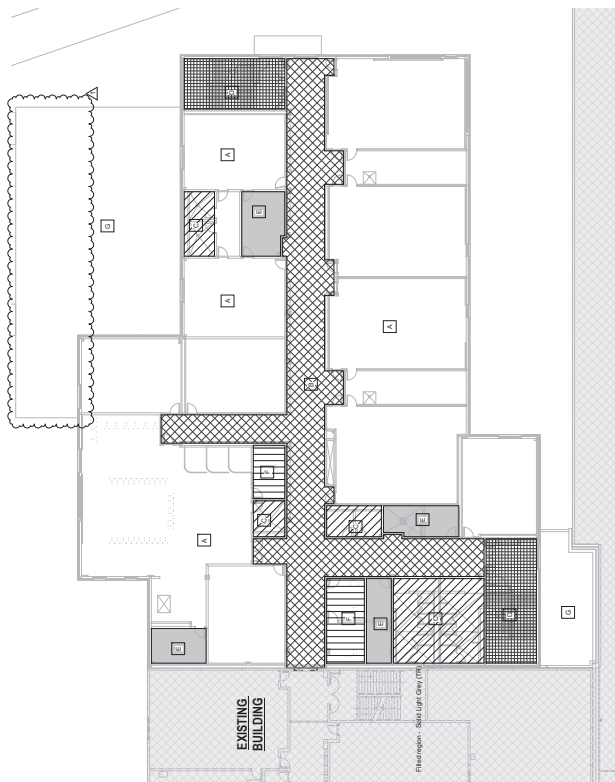


PES STRUCTURAL ENGINEERS
ADDRESS: 1005 COMPTON RD, SUITE 2000, SUWANE, GEORGIA 30024
PHONE: (404) 452-8100
FAX: (404) 452-8110
PE LICENSE NUMBER: 027014
PE EXPIRATION DATE: 09/30/2018

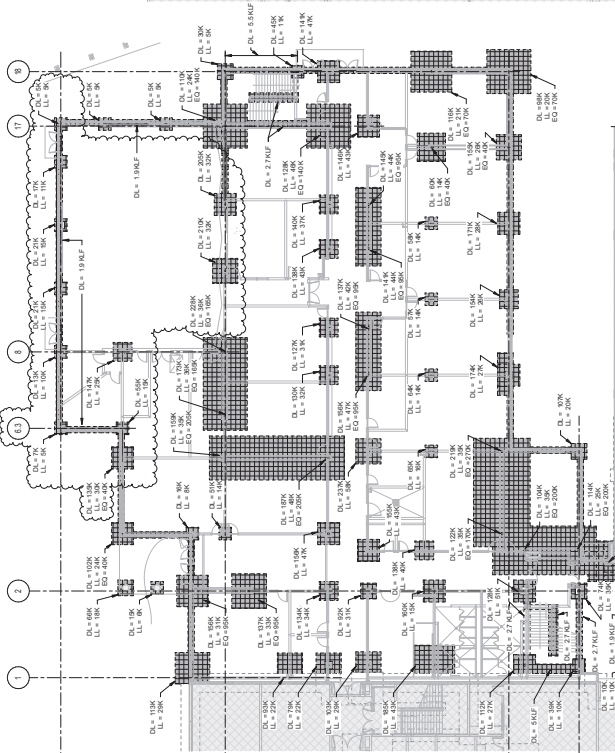
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DATE	DESCRIPTION	BY
11/19/14	ISSUE FOR PERMIT	ML
11/17/14	REVISED PERMIT SET	ML
11/17/14	REVISED PERMIT SET	ML
12/15/14	ADDITIONAL SHEET	ML

FACILITY CODE 067-4596

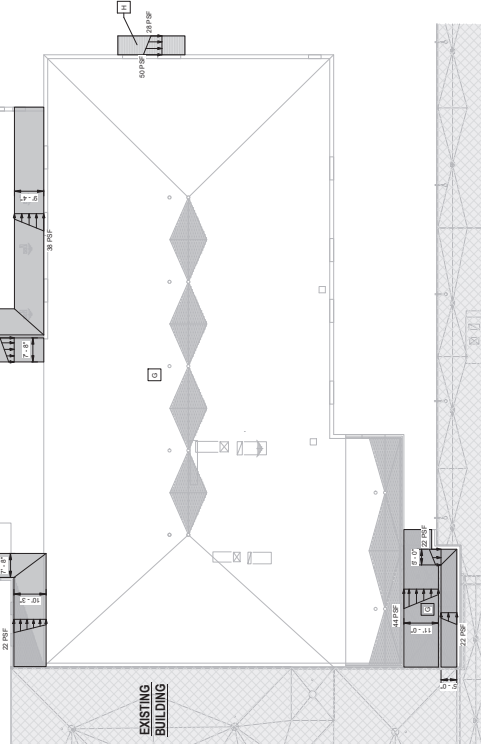


SECOND FLOOR LOAD MAP
SCALE: 1/8" = 1'-0"



THIRD FLOOR LOAD MAP
SCALE: 1/8" = 1'-0"

AGGREGATE PIER LOAD MAP
SCALE: 1/8" = 1'-0"



OVERALL ROOF LOAD MAP
SCALE: 1/8" = 1'-0"

- LOAD MAP KEY
- | LOAD MARK | OCCUPANCY | SUPERIMPOSED LOAD | LIVE LOAD | DEAD LOAD | MINIMUM ROOF (P) | ROOF LOAD | REDUCTION | WIND UPLIFT | WIND DOWN |
|-----------|------------|-------------------|-----------|-----------|------------------|-----------|-----------|-------------|-----------|
| A | OFFICE | 15 | 40 | 10 | 100 | 100 | 0 | 10 | 10 |
| B | RECREATION | 15 | 60 | 10 | 100 | 100 | 0 | 10 | 10 |
| C | RECREATION | 15 | 60 | 10 | 100 | 100 | 0 | 10 | 10 |
| D | RECREATION | 15 | 60 | 10 | 100 | 100 | 0 | 10 | 10 |
| E | RECREATION | 15 | 60 | 10 | 100 | 100 | 0 | 10 | 10 |
| F | RECREATION | 15 | 60 | 10 | 100 | 100 | 0 | 10 | 10 |
| G | ROOF | 20 | 0 | 0 | 20 | 20 | 0 | 0 | 0 |
| H | ROOF | 20 | 0 | 0 | 20 | 20 | 0 | 0 | 0 |
- LOAD MAP NOTES
- 1. FOR DESIGN LOAD DETERMINE USE IS1.
 - 2. SUPERIMPOSED LOADS ARE IN ADDITION TO THE SELF WEIGHT OF THE STRUCTURE.
 - 3. SUPERIMPOSED LOADS ARE IN ADDITION TO THE SELF WEIGHT OF THE STRUCTURE.
 - 4. SUPERIMPOSED LOADS ARE IN ADDITION TO THE SELF WEIGHT OF THE STRUCTURE.
 - 5. SUPERIMPOSED LOADS ARE IN ADDITION TO THE SELF WEIGHT OF THE STRUCTURE.
 - 6. SUPERIMPOSED LOADS ARE IN ADDITION TO THE SELF WEIGHT OF THE STRUCTURE.
 - 7. SUPERIMPOSED LOADS ARE IN ADDITION TO THE SELF WEIGHT OF THE STRUCTURE.
 - 8. SUPERIMPOSED LOADS ARE IN ADDITION TO THE SELF WEIGHT OF THE STRUCTURE.
 - 9. SUPERIMPOSED LOADS ARE IN ADDITION TO THE SELF WEIGHT OF THE STRUCTURE.
 - 10. SUPERIMPOSED LOADS ARE IN ADDITION TO THE SELF WEIGHT OF THE STRUCTURE.

- AGGREGATE PIER LOAD MAP NOTES
1. SHOWS LOCATION WHERE COLUMN REMOVAL SHALL FOLLOW SYSTEMS APPROVED BY THE BOARD OF ARCHITECTS.
 2. SHOWS LOCATION WHERE COLUMN REMOVAL SHALL FOLLOW SYSTEMS APPROVED BY THE BOARD OF ARCHITECTS.
 3. SHOWS LOCATION WHERE COLUMN REMOVAL SHALL FOLLOW SYSTEMS APPROVED BY THE BOARD OF ARCHITECTS.
 4. SHOWS LOCATION WHERE COLUMN REMOVAL SHALL FOLLOW SYSTEMS APPROVED BY THE BOARD OF ARCHITECTS.
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 7. SHOWS LOCATION WHERE COLUMN REMOVAL SHALL FOLLOW SYSTEMS APPROVED BY THE BOARD OF ARCHITECTS.
 8. SHOWS LOCATION WHERE COLUMN REMOVAL SHALL FOLLOW SYSTEMS APPROVED BY THE BOARD OF ARCHITECTS.
 9. SHOWS LOCATION WHERE COLUMN REMOVAL SHALL FOLLOW SYSTEMS APPROVED BY THE BOARD OF ARCHITECTS.
 10. SHOWS LOCATION WHERE COLUMN REMOVAL SHALL FOLLOW SYSTEMS APPROVED BY THE BOARD OF ARCHITECTS.

- THIRD FLOOR LOAD MAP NOTES
1. EXISTING WALL FOOTING IS 24" WIDE UNLESS NOTED OTHERWISE.
 2. EXISTING WALL FOOTING IS 24" WIDE UNLESS NOTED OTHERWISE.
 3. EXISTING WALL FOOTING IS 24" WIDE UNLESS NOTED OTHERWISE.
 4. EXISTING WALL FOOTING IS 24" WIDE UNLESS NOTED OTHERWISE.
 5. EXISTING WALL FOOTING IS 24" WIDE UNLESS NOTED OTHERWISE.
 6. EXISTING WALL FOOTING IS 24" WIDE UNLESS NOTED OTHERWISE.
 7. EXISTING WALL FOOTING IS 24" WIDE UNLESS NOTED OTHERWISE.
 8. EXISTING WALL FOOTING IS 24" WIDE UNLESS NOTED OTHERWISE.
 9. EXISTING WALL FOOTING IS 24" WIDE UNLESS NOTED OTHERWISE.
 10. EXISTING WALL FOOTING IS 24" WIDE UNLESS NOTED OTHERWISE.

- OVERALL ROOF LOAD MAP NOTES
1. DENOTES LOCATION OF ROOF DRIFT, ROOF LOAD WARES AND FLASHING.
 2. DENOTES LOCATION OF ROOF DRIFT, ROOF LOAD WARES AND FLASHING.
 3. DENOTES LOCATION OF ROOF DRIFT, ROOF LOAD WARES AND FLASHING.
 4. DENOTES LOCATION OF ROOF DRIFT, ROOF LOAD WARES AND FLASHING.
 5. DENOTES LOCATION OF ROOF DRIFT, ROOF LOAD WARES AND FLASHING.
 6. DENOTES LOCATION OF ROOF DRIFT, ROOF LOAD WARES AND FLASHING.
 7. DENOTES LOCATION OF ROOF DRIFT, ROOF LOAD WARES AND FLASHING.
 8. DENOTES LOCATION OF ROOF DRIFT, ROOF LOAD WARES AND FLASHING.
 9. DENOTES LOCATION OF ROOF DRIFT, ROOF LOAD WARES AND FLASHING.
 10. DENOTES LOCATION OF ROOF DRIFT, ROOF LOAD WARES AND FLASHING.

EXISTING BUILDING

EXISTING BUILDING

FOR
EAST ADDITION
NORTH GWINNETT HIGH SCHOOL
 20 LEVEL CREEK ROAD, SUWANEE, GA 30024
 GWINNETT COUNTY BOARD OF EDUCATION
 GWINNETT COUNTY, GEORGIA

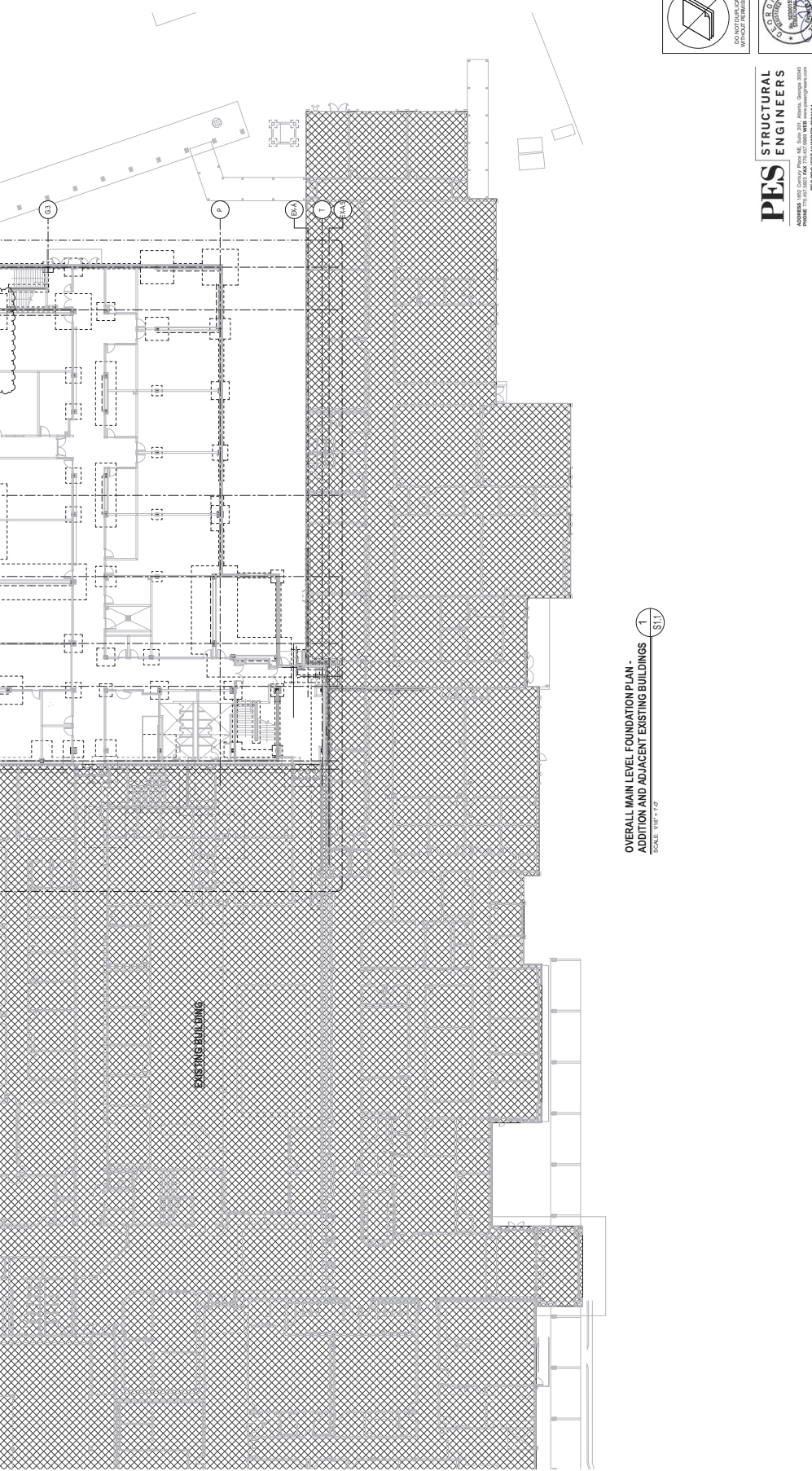
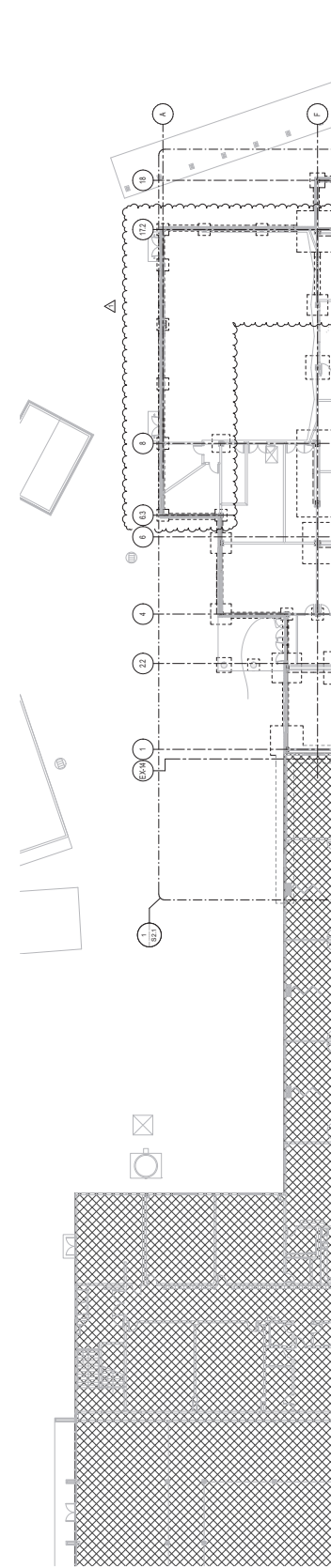
cunningham forhand mathews moore
 cunningham, forehand, mathews & moore, architects, inc. - 2011 manchester street, n.e. - atlanta, georgia 30324 - phone (404) 873-2152

S1.1

FACILITY CODE 687-4598

DRAWING ISSUE RECORD

DATE	REVISION	BY
11/17/2011	ISSUE FOR PERMITS	MM
11/17/2011	ISSUE FOR PERMITS	MM
11/17/2011	ISSUE FOR PERMITS	MM
11/17/2011	ISSUE FOR PERMITS	MM

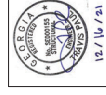


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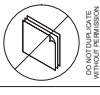
1
S1.1
 OVERALL MAIN LEVEL FOUNDATION PLAN -
 ADDITION AND ADJACENT EXISTING BUILDINGS
 SCALE: 1/8" = 1'-0"



PES STRUCTURAL ENGINEERS
 ADDRESS: 1000 GUNN STREET, N.E. SUWANEE, GEORGIA 30024
 PHONE: (770) 886-1111
 FAX: (770) 886-1112
 P.E. PRODUCT NUMBER: 021114
 P.E. EXPIRATION DATE: 06/30/19



12/14/21

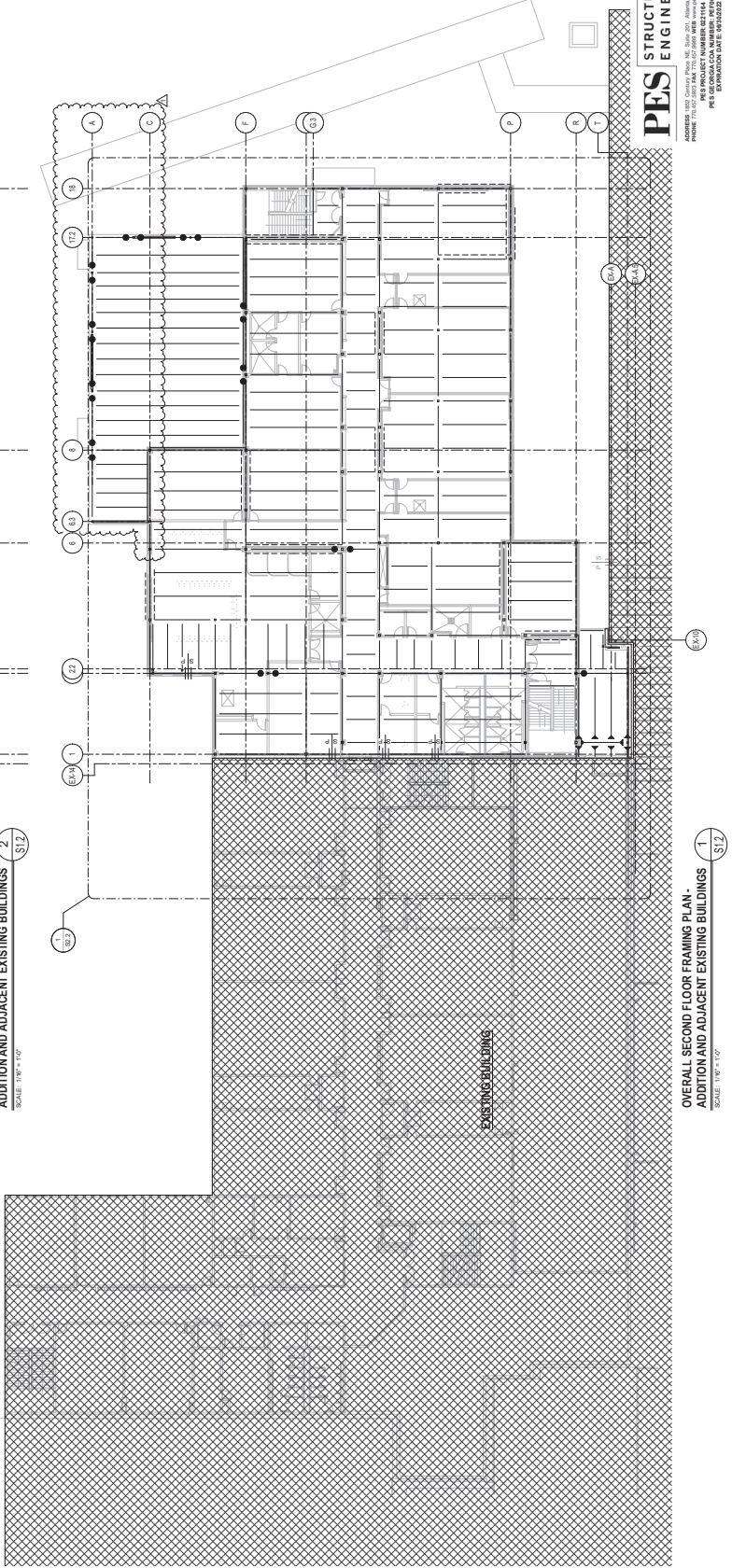
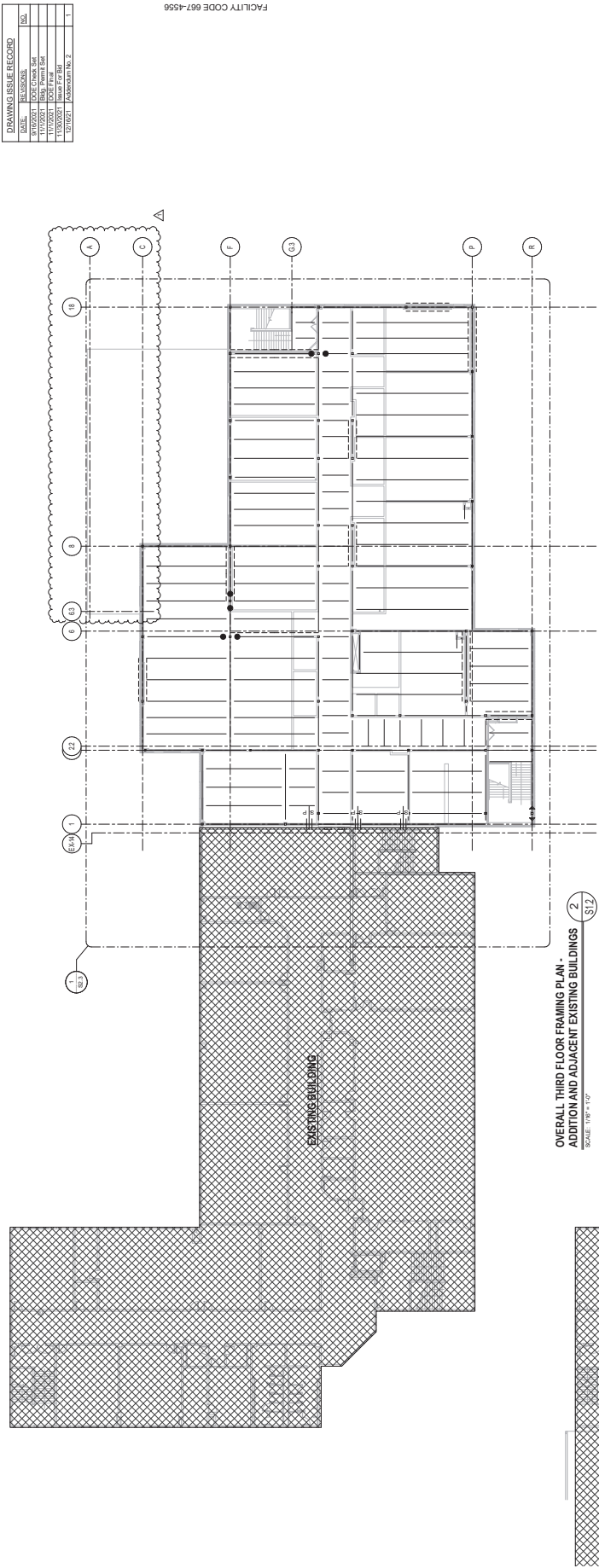


12/16/21

PES STRUCTURAL ENGINEERS
ADDRESS: 2005 CREEK ROAD, SUWANEE, GEORGIA 30024
PE PROJECT NUMBER: 21114
PE EXPIRATION DATE: 03/31/22

**OVERALL SECOND FLOOR FRAMING PLAN -
ADDITION AND ADJACENT EXISTING BUILDINGS**
SCALE: 1/8" = 1'-0"
1
S12

**OVERALL THIRD FLOOR FRAMING PLAN -
ADDITION AND ADJACENT EXISTING BUILDINGS**
SCALE: 1/8" = 1'-0"
2
S12



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**NORTH GWINNETT HIGH SCHOOL
EAST ADDITION**
20 LEVEL CREEK ROAD, SUWANEE, GA 30024
GWINNETT COUNTY BOARD OF EDUCATION
GWINNETT COUNTY, GEORGIA

FACILITY CODE 867-4556

DRAWING ISSUE RECORD

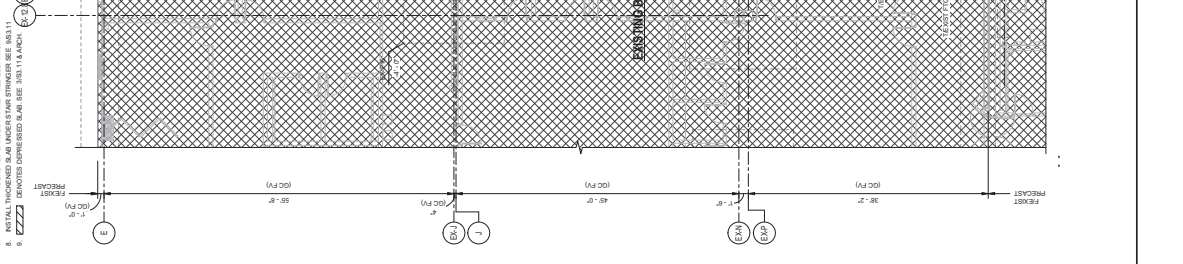
DATE	DESCRIPTION	BY
11/17/2021	REV. POWER SUPPLY	MS
11/17/2021	REV. FLOOR FINISH	MS
12/16/21	REVISION NO. 2	MS



S1.2

MAIN LEVEL FOUNDATION PLAN - EAST ADDITION AND EXISTING BLDG ALTERATIONS

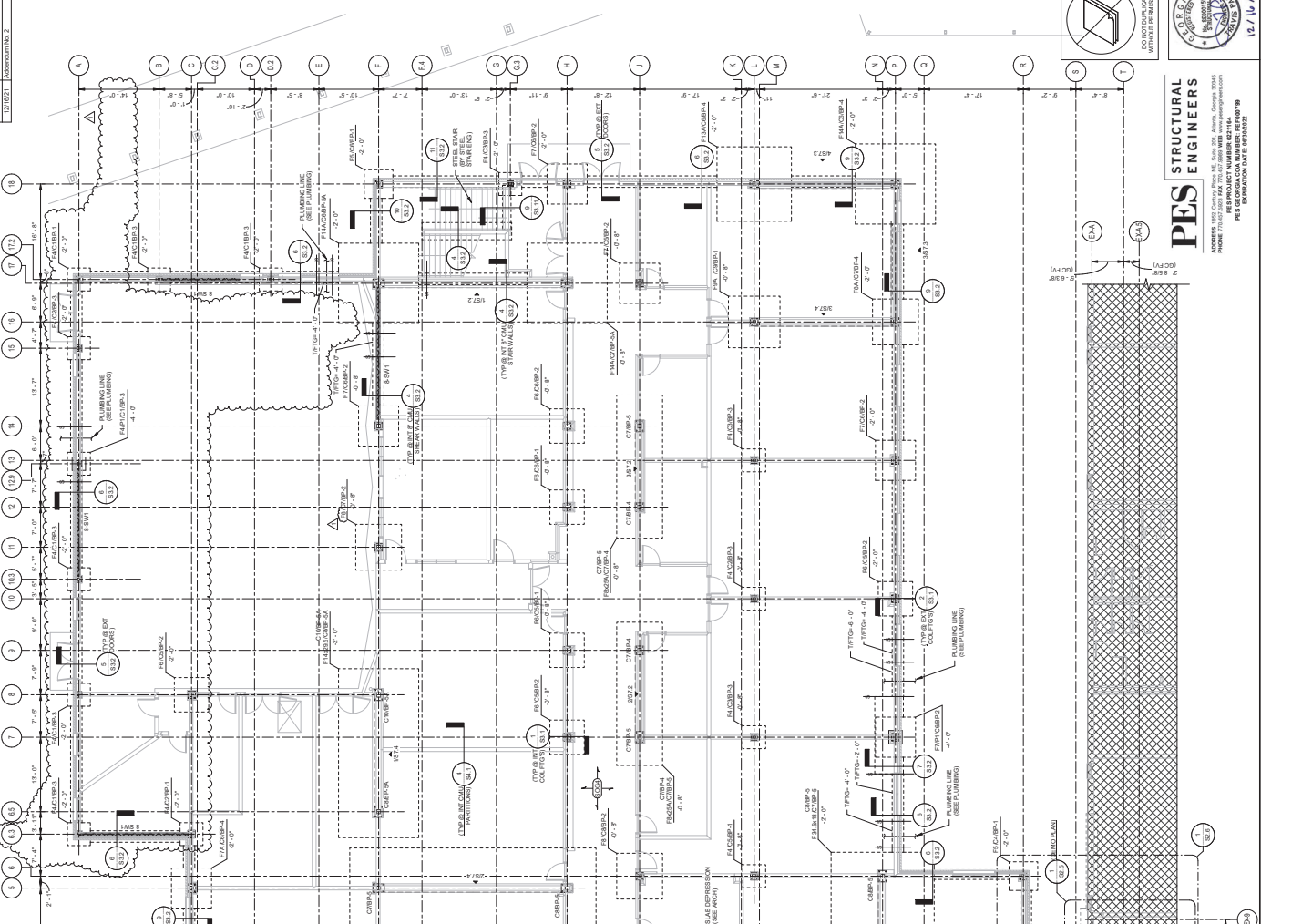
- 1. CONCRETE SLAB ON GROUND REINFORCED WITH W/IR BARS, 4" THICK, SEE SCHEDULE 10 FOR DETAILS.
- 2. BASE PATE MARKS SEE 5.01.1
- 3. COLUMN MARKS SEE 5.01.1
- 4. CONCRETE FLOOR SLAB WITH REINFORCING CHAIRS AND JOINT LOCATIONS FOR CONTRACTOR'S CONSTRUCTION.
- 5. FORMWORK AND BRACING SHALL BE FACED AND PROTECTED BEFORE POURING TO PREVENT DAMAGE TO FORMWORK AND REINFORCEMENT.
- 6. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 7. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 8. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 9. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 10. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 11. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 12. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 13. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 14. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 15. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 16. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 17. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 18. FOUNDATIONS WITH FOUNDATION WALLS AS SHOWN, EXCEPT WHERE NOTED OTHERWISE, SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.



- 19. SEE ARCHITECTURAL DRAWINGS FOR WALL THICKNESS AND FINISHES NOTED ON PLAN AS APPLICABLE IN ALL AREAS.
- 20. WALLS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 21. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 22. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 23. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 24. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 25. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 26. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 27. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 28. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 29. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 30. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 31. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 32. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 33. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 34. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 35. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 36. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 37. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 38. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 39. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.
- 40. FOUNDATIONS SHALL BE CONSTRUCTED TO A MINIMUM OF 18" BELOW FINISHED FLOOR LEVEL.



DRAWING ISSUE RECORD	
DATE	DESCRIPTION
11/17/2022	ISSUE FOR PERMITS
11/17/2022	ISSUE FOR PERMITS
11/17/2022	ISSUE FOR PERMITS
11/17/2022	ISSUE FOR PERMITS





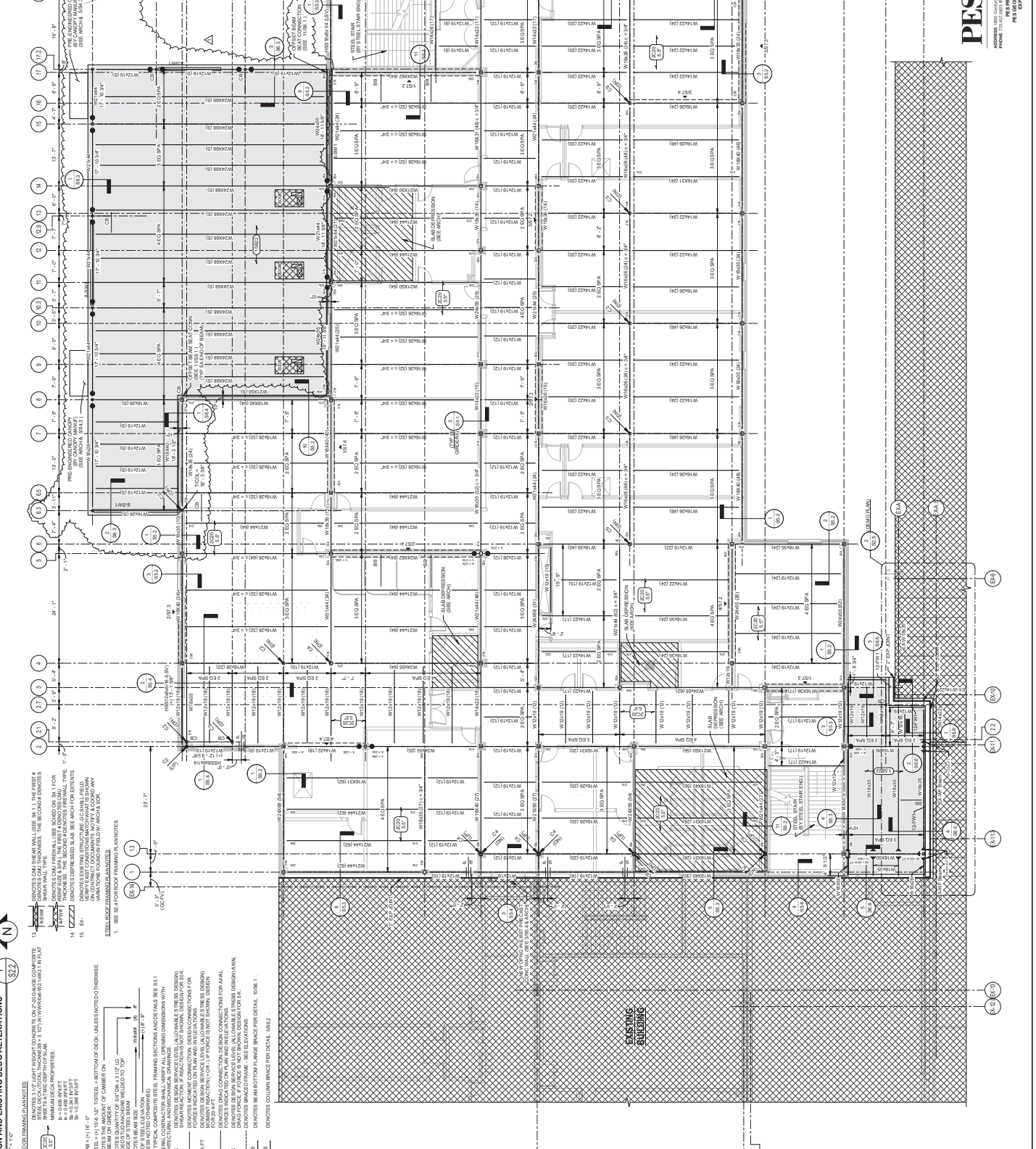
PES STRUCTURAL ENGINEERS
 ADDRESS: 1200 GATHERING PLACE, SUITE 500, LAWRENCEVILLE, GEORGIA 30046
 PHONE: (770) 962-2211
 FAX: (770) 962-2212
 WWW.PES-STRUCTURAL.COM

Project: NORTH GWINNETT HIGH SCHOOL EAST ADDITION
Location: 20 LEVEL CREEK ROAD, SWAYNE, GA 30024
Client: GWINNETT COUNTY BOARD OF EDUCATION
Contract No.: 11/0503 1005 0001 0001 0001 0001
Drawn by: MJD
Checked by: MJD
Date: 11/21/2017
Scale: ASB
Facility Code: 687-4598

Cunningham Federal Mathews Moore
 2011 Manchester Street, N.E. - Atlanta, Georgia 30324 - Phone (404) 873-2152

SECOND FLOOR FRAMING PLAN - EAST ADDITION AND EXISTING BLDG ALTERATIONS
 SCALE: 1/8" = 1'-0"

1. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH EXISTING STRUCTURE AND EXISTING CONDITIONS.
2. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH EXISTING STRUCTURE AND EXISTING CONDITIONS.
3. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH EXISTING STRUCTURE AND EXISTING CONDITIONS.
4. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH EXISTING STRUCTURE AND EXISTING CONDITIONS.
5. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH EXISTING STRUCTURE AND EXISTING CONDITIONS.
6. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH EXISTING STRUCTURE AND EXISTING CONDITIONS.
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8. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH EXISTING STRUCTURE AND EXISTING CONDITIONS.
9. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH EXISTING STRUCTURE AND EXISTING CONDITIONS.
10. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH EXISTING STRUCTURE AND EXISTING CONDITIONS.
11. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH EXISTING STRUCTURE AND EXISTING CONDITIONS.
12. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH EXISTING STRUCTURE AND EXISTING CONDITIONS.



S2.2
 12/16/14

ROOF FRAMING PLAN - EAST ADDITION

SCALE: 1/8" = 1'-0"



- STEEL ROOF FRAMING ANALYZED

2. SEE PLAN FOR TOP OF STEEL BEAMS
(1) - P, R, S
(2) - W, X, Y
(3) - W, X, Y
(4) - W, X, Y

3. W, X, Y DENOTES BEAM NUMBER AND CAP WELDED BENT BEAM (BENT POINT)

4. NOTES IN ROUNDED CORNERS INDICATE APPROXIMATE CENTER OF GRAVITY FOR EACH BEAM

5. NOTES IN ROUNDED CORNERS INDICATE APPROXIMATE CENTER OF GRAVITY FOR EACH BEAM

6. DIMENSIONS ARE TO BE TOLERANCES UNLESS OTHERWISE NOTED

7. MANUFACTURER OF STEEL BEAMS SHALL BE A-7. USE UNLESS NOTED OTHERWISE

8. DENOTES BEAM CONNECTION (CONNECTION TYPE FOR BEAM)

9. DENOTES BEAM CONNECTION (CONNECTION TYPE FOR BEAM)

10. DENOTES BEAM CONNECTION (CONNECTION TYPE FOR BEAM)

11. DENOTES BEAM CONNECTION (CONNECTION TYPE FOR BEAM)

12. DENOTES BEAM CONNECTION (CONNECTION TYPE FOR BEAM)

13. DENOTES BEAM CONNECTION (CONNECTION TYPE FOR BEAM)

14. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

15. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

16. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

17. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

18. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

19. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

20. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

21. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

22. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

23. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

24. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

25. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

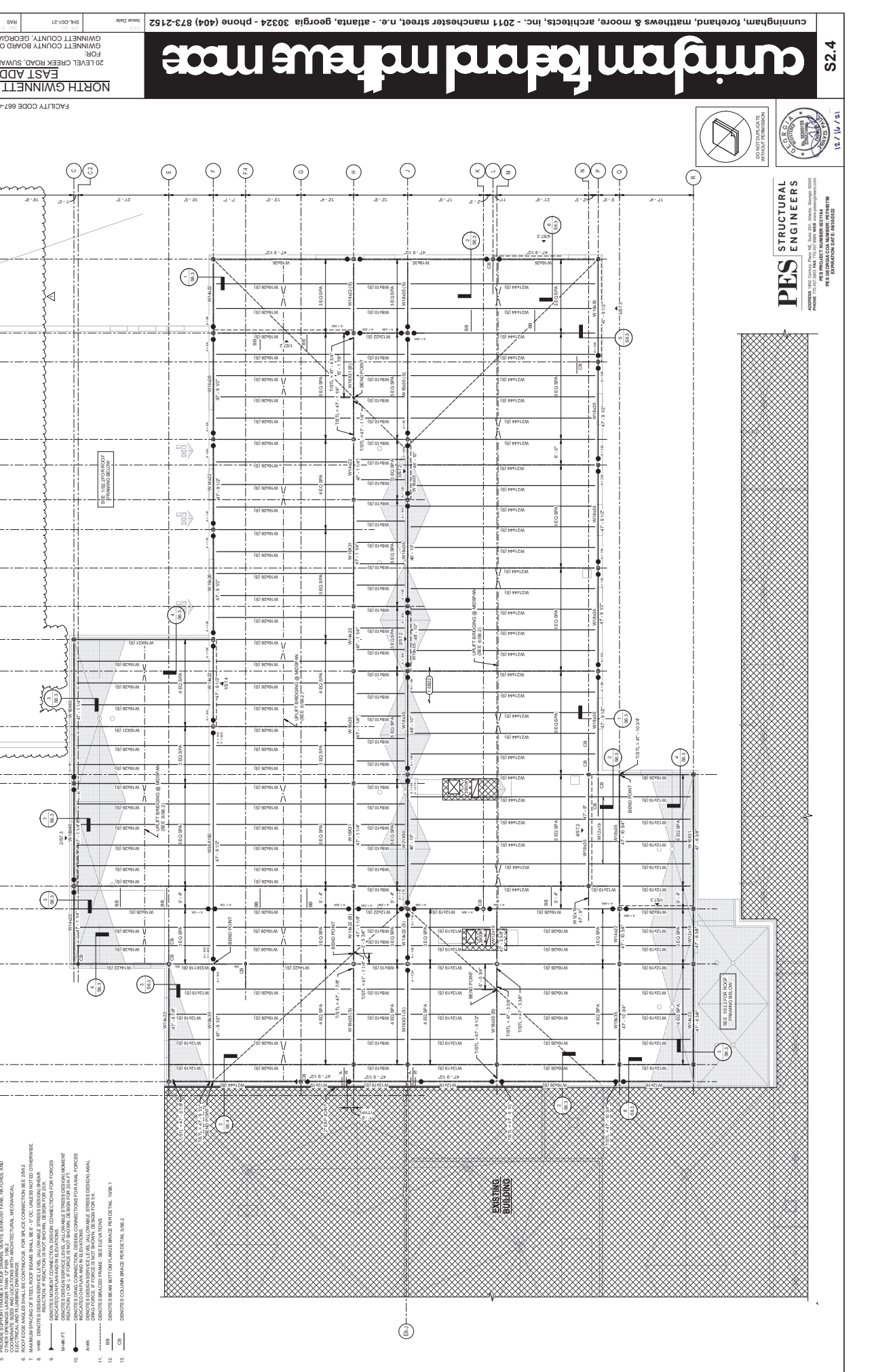
26. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

27. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

28. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

29. DENOTES GIRD LINE TYPE AND STEEL ROOF DECK

DATE	DESCRIPTION	BY	CHECKED
11/10/2010	REVISED	MM	MM
11/11/2010	REVISED	MM	MM
11/12/2010	REVISED	MM	MM
11/13/2010	REVISED	MM	MM
11/14/2010	REVISED	MM	MM



CUNNINGHAM FOREHAND MATTHEWS MOORE

cunningham, forehand, matthews & moore, architects, inc. - 2011 manchester street, n.e. - atlanta, georgia 30324 - phone (404) 873-2152

PES STRUCTURAL ENGINEERS

REGISTERED PROFESSIONAL ENGINEERS
 PROJECT NUMBER 021114
 PERMIT DATE 01/21/11

NORTH GWINNETT HIGH SCHOOL

EAST ADDITION

20 LEVEL CREEK ROAD, SUWANEE, GA 30024

FACILITY CODE 067-4558

S2.4

12/16/11

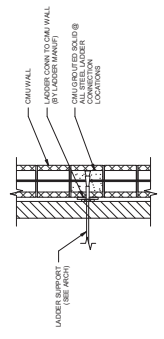
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11/17/2021	REVISED PER RFP
11/17/2021	REVISED PER RFP
11/17/2021	REVISED PER RFP
11/17/2021	REVISED PER RFP

NORTH GWINNETT HIGH SCHOOL
 EAST ADDITION
 20 LEVEL CREEK ROAD, SUWANEE, GA 30024
 GWINNETT COUNTY BOARD OF EDUCATION
 GWINNETT COUNTY, GEORGIA

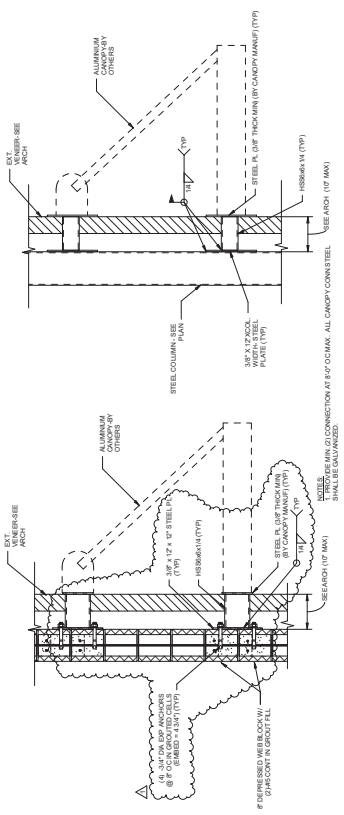
FACILITY CODE 687-4596



PES STRUCTURAL ENGINEERS
 ADDRESS: 1000 COTYLLA DRIVE, SUITE 200, ATLANTA, GEORGIA 30328
 PHONE: (404) 487-1000
 FAX: (404) 487-1001
 P.E. PRODUCT NUMBER 02114
 P.E. EXPIRATION DATE 06/30/19



1
ACCESS LADDER SUPPORT DETAIL
 SCALE: 1" = 1'-0"



2
TYPICAL ALUMINUM CANOPY DETAIL @ CMU WALL/STEEL COLUMN
 SCALE: 1" = 1'-0"

1. ALL STEEL SHALL BE A36. ALL ALUMINUM SHALL BE 6061-T6.
 2. FINAL CANOPY COORDS TO STRUCTURE SHALL BE COORDINATED WITH ARCHITECT AND MANUFACTURER.

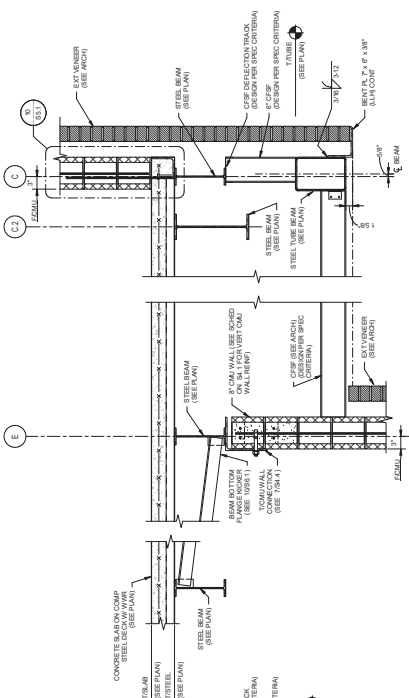


DRAWING ISSUE RECORD	
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11/17/2022	ISSUE FOR PERMITS
11/17/2022	ISSUE FOR PERMITS
11/17/2022	ISSUE FOR PERMITS
12/15/2021	ADDITIONAL NO. 2

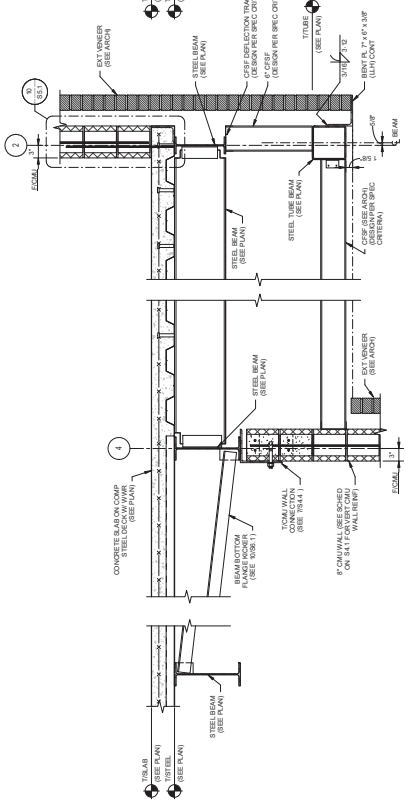
FACILITY CODE 087-4598
 NORTH GWINNETT HIGH SCHOOL
 EAST ADDITION
 20 LEVEL CREEK ROAD, SUWANEE, GA 30024
 GWINNETT COUNTY, GEORGIA



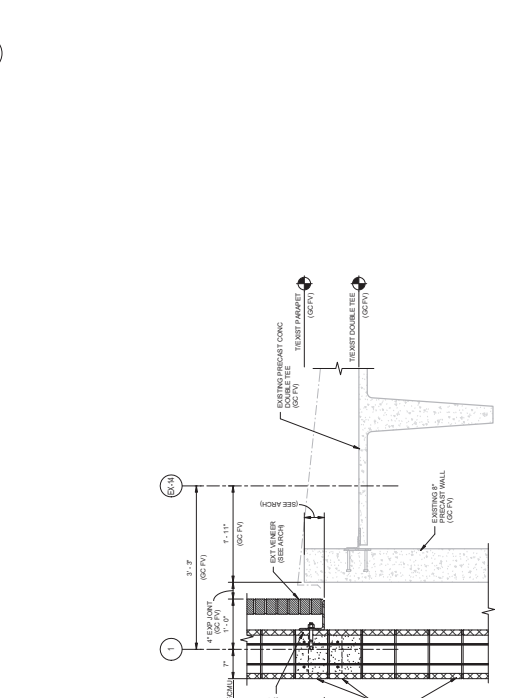
PES STRUCTURAL ENGINEERS
 ADDRESS: 1505 GUNN ST., SUITE 200, ATLANTA, GEORGIA 30309
 PHONE: (404) 525-1100
 FAX: (404) 525-1101
 P.E. PRODUCT NUMBER: 021714
 P.E. EXPIRATION DATE: 03/31/2022



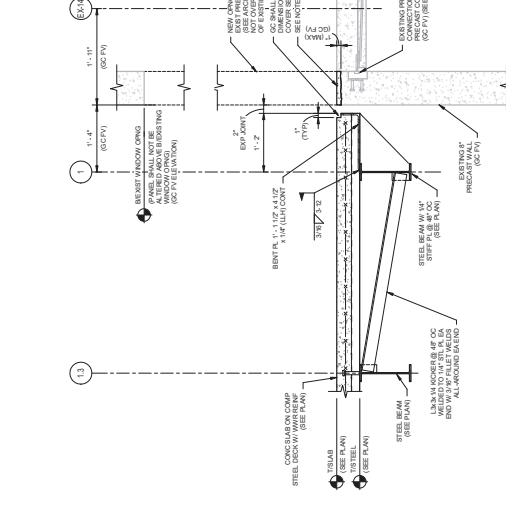
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SECTION 3
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SECTION 4
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SECTION 14
 SCALE: 1/4"=1'-0"

DRAWING ISSUE RECORD		
DATE	REVISION	BY
11/10/2010	1. ISSUED FOR PERMIT	MSK
11/10/2010	2. REVISIONS	MSK
11/10/2010	3. REVISED FOR PERMIT	MSK
12/10/10	4. REVISED FOR PERMIT	MSK
12/10/10	5. APPROVED FOR PERMIT	MSK

NORTH GWINNETT HIGH SCHOOL
EAST ADDITION
20 LEVEL CREEK ROAD, SWYMANEE, GA 30024
GWINNETT COUNTY BOARD OF EDUCATION
GWINNETT COUNTY, GEORGIA

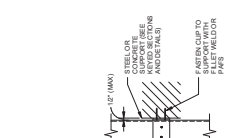
FACILITY CODE 87-4556
DATE 08/01/21
MSK

cunmyham forhand mathews moore
 cunmyham, forhand, mathews & moore, architects, inc. - 2011 manchester street, n.e. - atlanta, georgia 30324 - phone (404) 873-2152

PES STRUCTURAL ENGINEERS
 ADDRESS: 1000 CANTON ROAD, SUITE 200, ATLANTA, GEORGIA 30309
 P.E. PRODUCT NUMBER 027114
 P.E. EXPIRATION DATE: 09/30/19

12 / 10 / 21
S6.1

SCALE: 1"=1'-0"



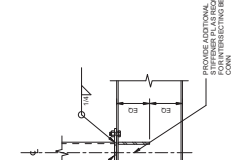
TYPICAL CONTINUOUS BEAM TO COLUMN CONNECTIONS - DETAILS
SCALE: 1"=1'-0"

W = WIDTH OF BEAM OR GIRDER FLANGE
 T = THICKNESS OF BEAM OR GIRDER FLANGE
 t = THICKNESS OF FLANGE PLATE
 W2 = WIDTH OF BEAM OR GIRDER FLANGE
 t2 = THICKNESS OF FLANGE PLATE



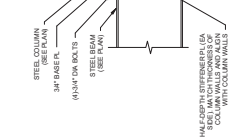
TYPICAL BEAM TO COL CONNECTION
SCALE: 1"=1'-0"

1. W1 SHALL BE 1" LESS THAN BEAM FLANGE WIDTH.
 2. PLATE THICKNESS AND LENGTH (DESIGNATED 'F') SHALL BE DESIGNED BY THE FABRICATOR.
 3. STANDARD BRACE CONNECTIONS SHALL BE SHOWN ON PLAN.
 4. STANDARD BRACE CONNECTIONS SHALL BE SHOWN ON PLAN.



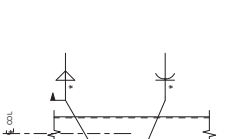
TYPICAL HSS COLUMN-TO-TRANSFER BEAM CONNECTION
SCALE: 1"=1'-0"

1. FABRICATOR HAS THE OPTION TO USE ALTERNATE MOMENT CONNECTION. SUBMIT DETAIL FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OF FRAMEWORK. IF FABRICATOR USES ALTERNATE MOMENT CONNECTION, THE CONNECTION SHALL BE SHOWN ON PLAN.
 2. FABRICATOR SHALL PROVIDE DETAIL FOR ALL CONNECTIONS.
 3. CONNECTIONS OF 1/2" MANHOLE SHALL BE SHOWN ON PLAN.
 4. 3/4" DIA THROU BOLT SHALL BE SHOWN ON PLAN.



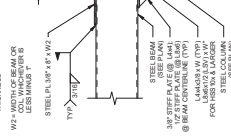
TYPICAL VERTICAL DEFLECTION STUD CONNECTIONS - SECTION
SCALE: 1"=1'-0"

1. FABRICATOR HAS THE OPTION TO USE ALTERNATE MOMENT CONNECTION. SUBMIT DETAIL FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OF FRAMEWORK. IF FABRICATOR USES ALTERNATE MOMENT CONNECTION, THE CONNECTION SHALL BE SHOWN ON PLAN.
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 3. CONNECTIONS OF 1/2" MANHOLE SHALL BE SHOWN ON PLAN.
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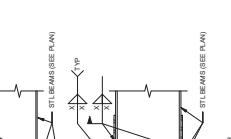
TYPICAL WIDE FLANGE BEAM TO HSS COLUMN MOMENT CONNECTIONS - SECTION
SCALE: 3/4"=1'-0"

1. FABRICATOR HAS THE OPTION TO USE ALTERNATE MOMENT CONNECTION. SUBMIT DETAIL FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OF FRAMEWORK. IF FABRICATOR USES ALTERNATE MOMENT CONNECTION, THE CONNECTION SHALL BE SHOWN ON PLAN.
 2. FABRICATOR SHALL PROVIDE DETAIL FOR ALL CONNECTIONS.
 3. CONNECTIONS OF 1/2" MANHOLE SHALL BE SHOWN ON PLAN.
 4. 3/4" DIA THROU BOLT SHALL BE SHOWN ON PLAN.



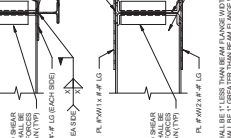
TYP VERT SLIP CONN @ COLUMNS @ UNDERSIDE OF STEEL DECK
SCALE: 1"=1'-0"

1. FABRICATOR HAS THE OPTION TO USE ALTERNATE MOMENT CONNECTION. SUBMIT DETAIL FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OF FRAMEWORK. IF FABRICATOR USES ALTERNATE MOMENT CONNECTION, THE CONNECTION SHALL BE SHOWN ON PLAN.
 2. FABRICATOR SHALL PROVIDE DETAIL FOR ALL CONNECTIONS.
 3. CONNECTIONS OF 1/2" MANHOLE SHALL BE SHOWN ON PLAN.
 4. 3/4" DIA THROU BOLT SHALL BE SHOWN ON PLAN.



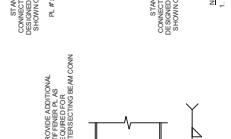
TYP VERT SLIP CONN @ COLUMNS @ UNDERSIDE OF STEEL DECK
SCALE: 1"=1'-0"

1. FABRICATOR HAS THE OPTION TO USE ALTERNATE MOMENT CONNECTION. SUBMIT DETAIL FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OF FRAMEWORK. IF FABRICATOR USES ALTERNATE MOMENT CONNECTION, THE CONNECTION SHALL BE SHOWN ON PLAN.
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 3. CONNECTIONS OF 1/2" MANHOLE SHALL BE SHOWN ON PLAN.
 4. 3/4" DIA THROU BOLT SHALL BE SHOWN ON PLAN.



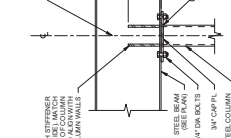
TYPICAL RIGID STUD CONNECTION - SECTION
SCALE: 1"=1'-0"

1. FABRICATOR HAS THE OPTION TO USE ALTERNATE MOMENT CONNECTION. SUBMIT DETAIL FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OF FRAMEWORK. IF FABRICATOR USES ALTERNATE MOMENT CONNECTION, THE CONNECTION SHALL BE SHOWN ON PLAN.
 2. FABRICATOR SHALL PROVIDE DETAIL FOR ALL CONNECTIONS.
 3. CONNECTIONS OF 1/2" MANHOLE SHALL BE SHOWN ON PLAN.
 4. 3/4" DIA THROU BOLT SHALL BE SHOWN ON PLAN.



TYPICAL BEAM BRACING - SECTION
SCALE: 3/4"=1'-0"

1. FABRICATOR HAS THE OPTION TO USE ALTERNATE MOMENT CONNECTION. SUBMIT DETAIL FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OF FRAMEWORK. IF FABRICATOR USES ALTERNATE MOMENT CONNECTION, THE CONNECTION SHALL BE SHOWN ON PLAN.
 2. FABRICATOR SHALL PROVIDE DETAIL FOR ALL CONNECTIONS.
 3. CONNECTIONS OF 1/2" MANHOLE SHALL BE SHOWN ON PLAN.
 4. 3/4" DIA THROU BOLT SHALL BE SHOWN ON PLAN.



TYPICAL OFFSET BEAM SEAT CONNECTION - DETAIL
SCALE: 1"=1'-0"

1. FABRICATOR HAS THE OPTION TO USE ALTERNATE MOMENT CONNECTION. SUBMIT DETAIL FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OF FRAMEWORK. IF FABRICATOR USES ALTERNATE MOMENT CONNECTION, THE CONNECTION SHALL BE SHOWN ON PLAN.
 2. FABRICATOR SHALL PROVIDE DETAIL FOR ALL CONNECTIONS.
 3. CONNECTIONS OF 1/2" MANHOLE SHALL BE SHOWN ON PLAN.
 4. 3/4" DIA THROU BOLT SHALL BE SHOWN ON PLAN.



TYPICAL RIGID STUD CONNECTION - SECTION
SCALE: 1"=1'-0"

NORTH GWINNETT HIGH SCHOOL
 EAST ADDITION
 20 LEVEL CREEK ROAD, SUWANEE, GA 30024
 GWINNETT COUNTY BOARD OF EDUCATION
 GWINNETT COUNTY, GEORGIA

FACILITY CODE 087-4556

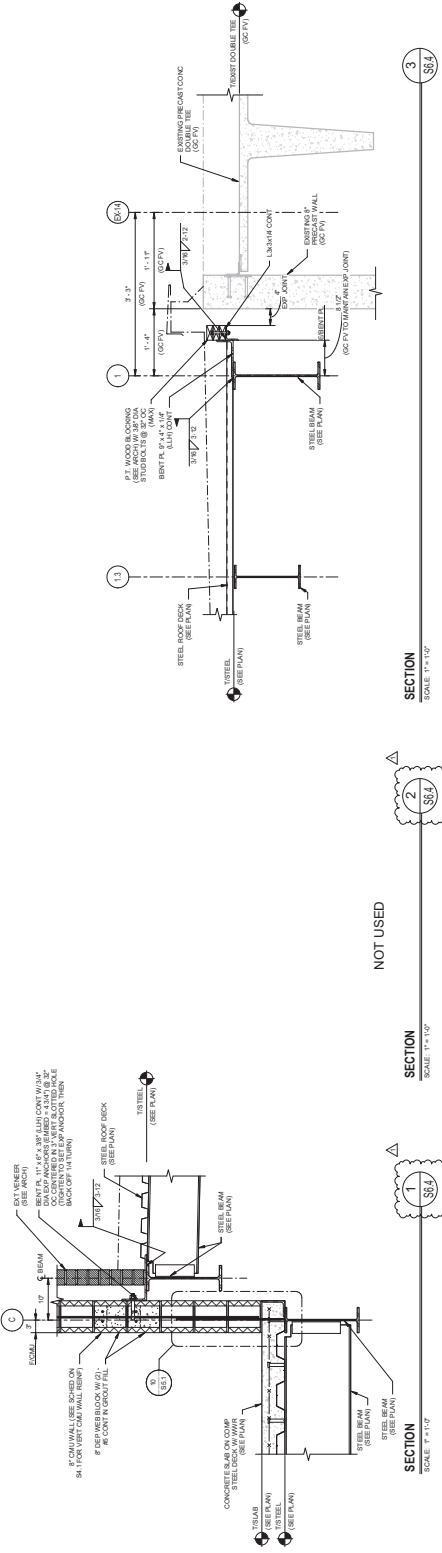
DATE	REVISIONS	BY
11/17/2011	ISSUE FOR PERMITS	MM
11/17/2011	ISSUE FOR PERMITS	MM
11/17/2011	ISSUE FOR PERMITS	MM
12/15/2011	ADDITIONAL NO. 2	MM

DRAWING ISSUE RECORD	
DATE	REVISIONS
11/17/2011	ISSUE FOR PERMITS
11/17/2011	ISSUE FOR PERMITS
11/17/2011	ISSUE FOR PERMITS
12/15/2011	ADDITIONAL NO. 2



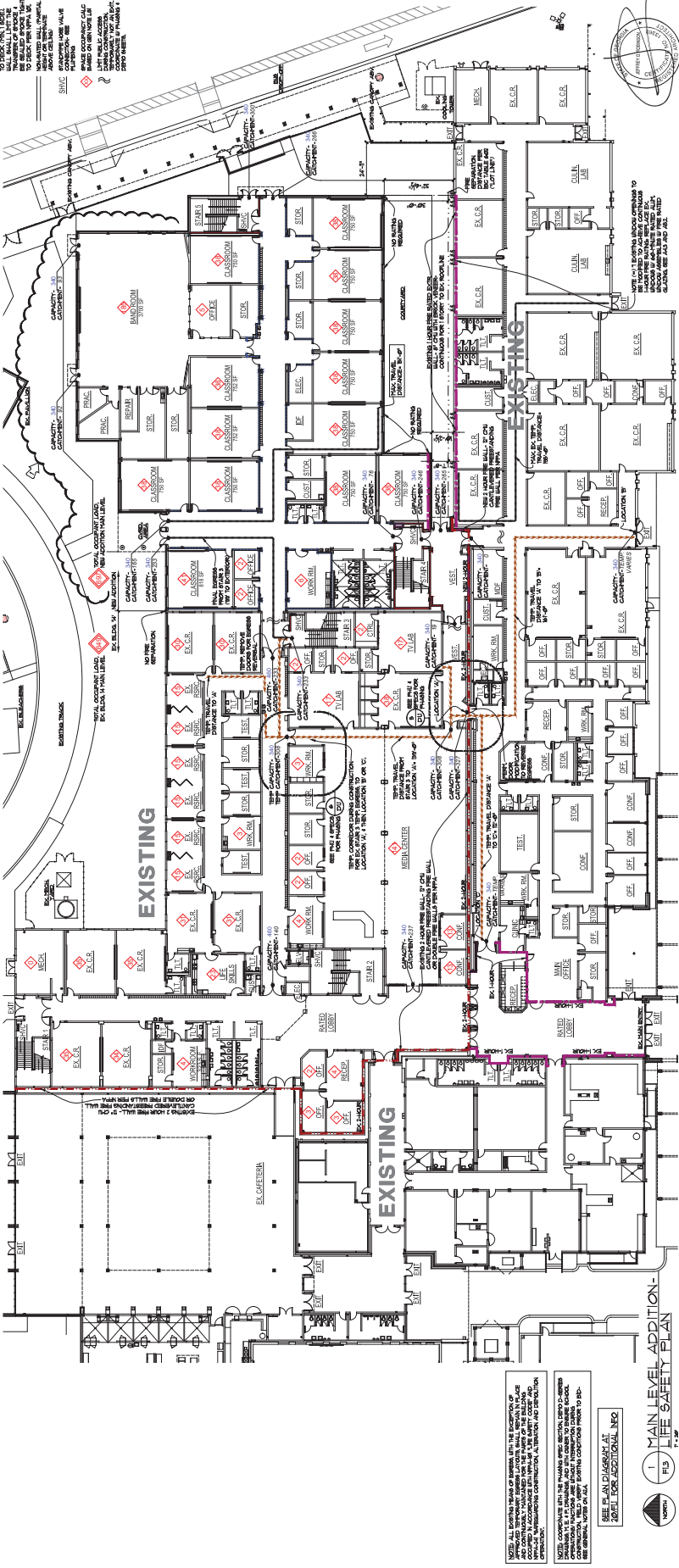
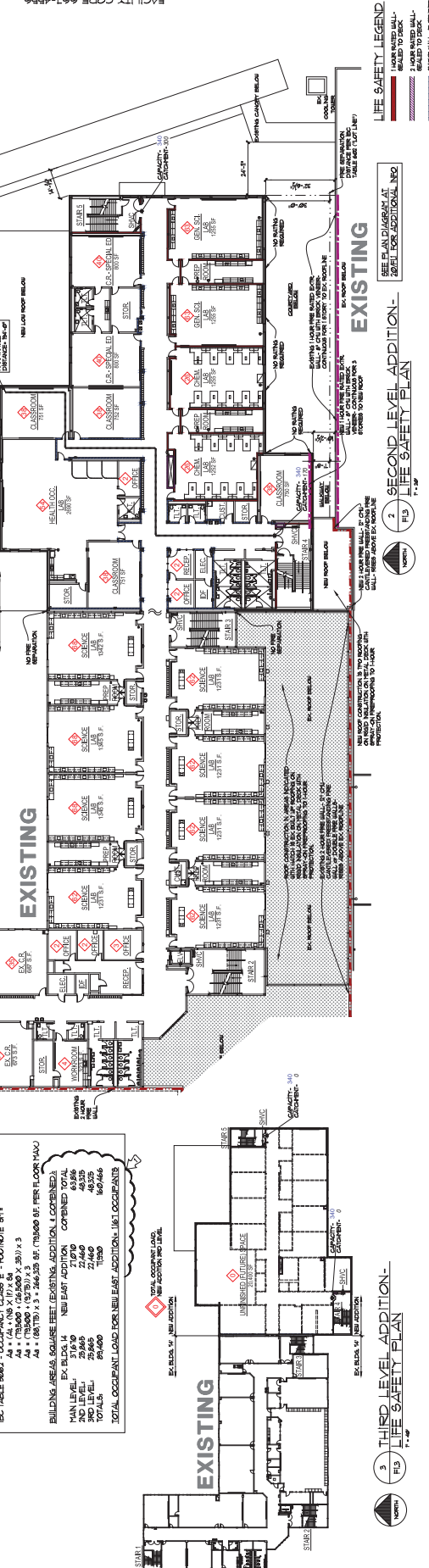
PES STRUCTURAL ENGINEERS
 ADDRESS: 1000 COUNTY ROAD 162, SUWANEE, GEORGIA 30024
 PHONE: (770) 241-1111
 FAX: (770) 241-1112
 P.E. PRODUCT NUMBER: 021114
 P.E. EXPIRATION DATE: 06/30/19

12 / 14 / 21



NOT USED

DATE	REVISION	NO.
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11/14/13	FOR PERMIT	2
11/14/13	FOR PERMIT	3
11/14/13	FOR PERMIT	4
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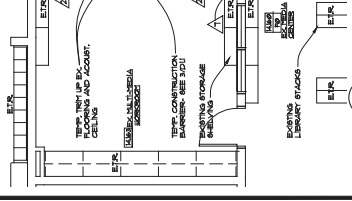
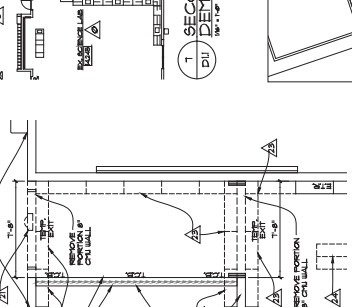
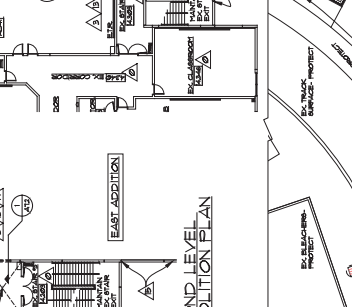
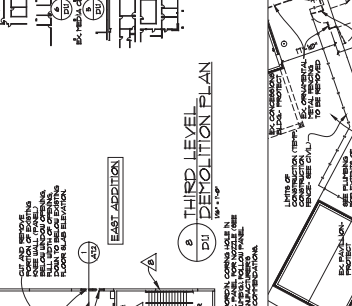
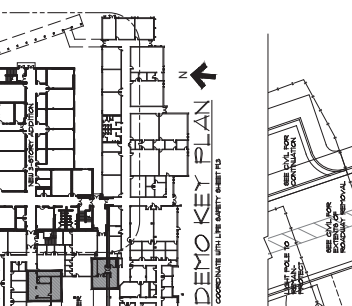
NOTE: ALL BUILDING AREAS OF 10,000 SF OR MORE SHALL BE EQUIPPED WITH AN APPROVED FIRE EXTINGUISHER AS PER IBC 907.2.1.1. THE NUMBER OF EXTINGUISHERS SHALL BE DETERMINED BY THE AREA OF THE BUILDING. THE EXTINGUISHERS SHALL BE OF THE TYPE AND RATING AS SPECIFIED IN THE IBC. THE EXTINGUISHERS SHALL BE MAINTAINED AND RECHARGED AS PER IBC 907.2.1.2. THE EXTINGUISHERS SHALL BE KEPT IN A CLEAR ACCESSIBLE LOCATION.

NOTE: COMPARTMENTS WITH THE MAXIMUM SPECIFIED HEIGHT SHALL BE EQUIPPED WITH A SMOKE DETECTOR AS PER IBC 907.2.1.3. THE DETECTOR SHALL BE OF THE TYPE AND RATING AS SPECIFIED IN THE IBC. THE DETECTOR SHALL BE MAINTAINED AND RECHARGED AS PER IBC 907.2.1.4. THE DETECTOR SHALL BE KEPT IN A CLEAR ACCESSIBLE LOCATION.

DATE	REVISION	NO.
10/27/11	BLACK PRINT SET	1
10/27/11	DOE FINAL	2
11/14/11	ADDITION NO. 2	3

DRAWING ISSUE RECORD

GENERAL CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND CONDITIONS AT THE TIME OF WORK. BEFORE ANY WORK IS BEGAN IN THE EXISTING BUILDING, CONTRACTOR SHALL CONDUCT A VISUAL SURVEY OF THE EXISTING BUILDING TO VERIFY THE CONTRACTOR'S UNDERSTANDING OF THE EXISTING CONDITIONS OF THE BUILDING. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL APPLICABLE AGENCIES AND AGENCIES. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND CONDITIONS AT THE TIME OF WORK. BEFORE ANY WORK IS BEGAN IN THE EXISTING BUILDING, CONTRACTOR SHALL CONDUCT A VISUAL SURVEY OF THE EXISTING BUILDING TO VERIFY THE CONTRACTOR'S UNDERSTANDING OF THE EXISTING CONDITIONS OF THE BUILDING. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL APPLICABLE AGENCIES AND AGENCIES.



GENERAL DEMOLITION NOTES:

1. GENERAL CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND CONDITIONS AT THE TIME OF WORK. BEFORE ANY WORK IS BEGAN IN THE EXISTING BUILDING, CONTRACTOR SHALL CONDUCT A VISUAL SURVEY OF THE EXISTING BUILDING TO VERIFY THE CONTRACTOR'S UNDERSTANDING OF THE EXISTING CONDITIONS OF THE BUILDING. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL APPLICABLE AGENCIES AND AGENCIES.

DEMOLITION KEY NOTES:

NO DEMOLITION REQUIRED AT THE SPACE UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DEMOLITION PLAN. CONTRACTOR SHALL VERIFY THE EXISTING CONDITIONS OF THE BUILDING AND SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL APPLICABLE AGENCIES AND AGENCIES.

DEMOLITION LEGEND:

REMOVE EXISTING WALLS
REMOVE EXISTING FLOORING
REMOVE EXISTING ROOFING
REMOVE EXISTING STRUCTURE
REMOVE EXISTING MECHANICAL AND ELECTRICAL EQUIPMENT
REMOVE EXISTING LIGHT FIXTURES AND ASSOCIATED WIRING
REMOVE EXISTING LIGHT FIXTURES AND ASSOCIATED WIRING
REMOVE EXISTING LIGHT FIXTURES AND ASSOCIATED WIRING

OVERALL MAIN LEVEL DEMOLITION PLAN - PHASED WORK

1. OVERALL MAIN LEVEL DEMOLITION PLAN - PHASED WORK

2. WALL REPAIR DETAIL AT EXISTING MAIN LEVEL

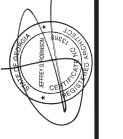
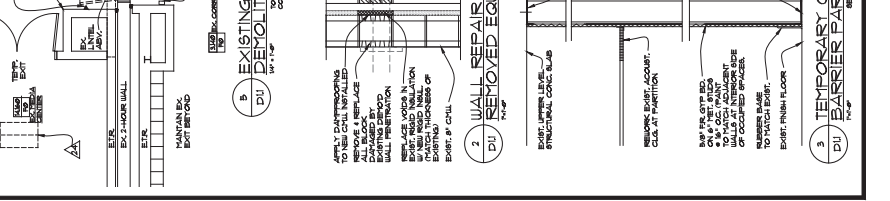
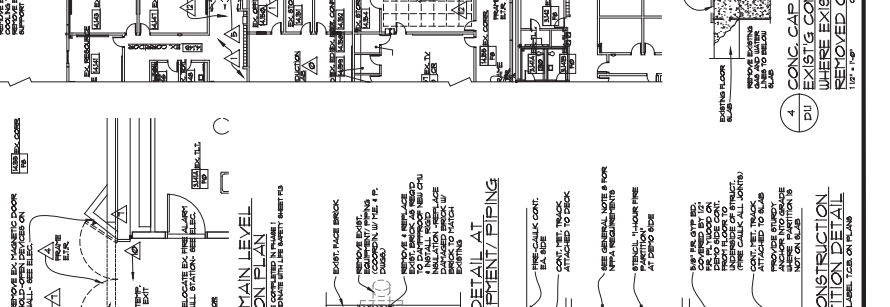
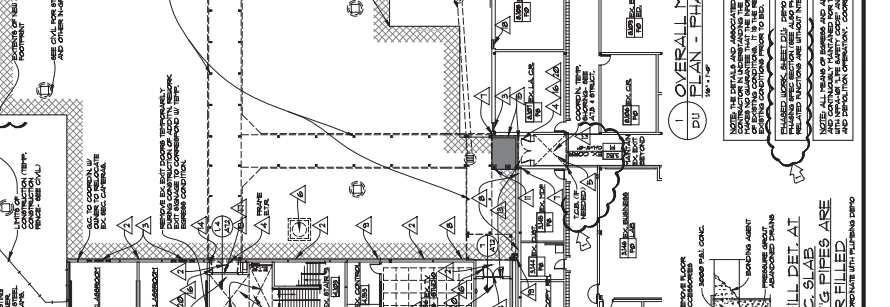
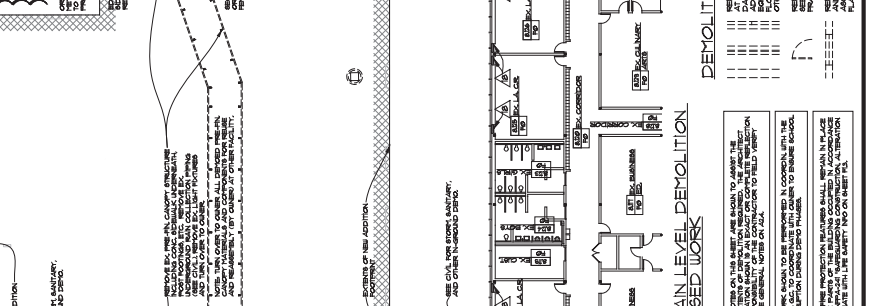
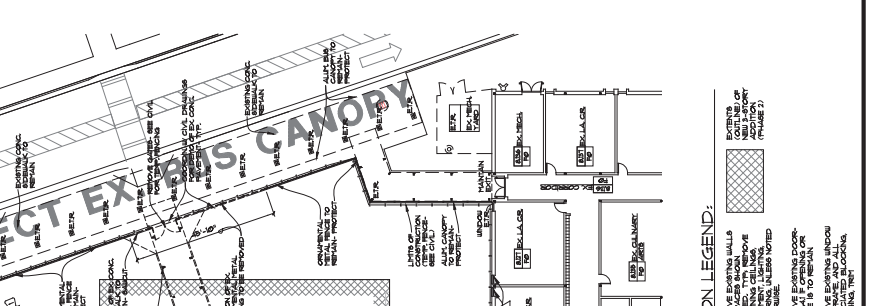
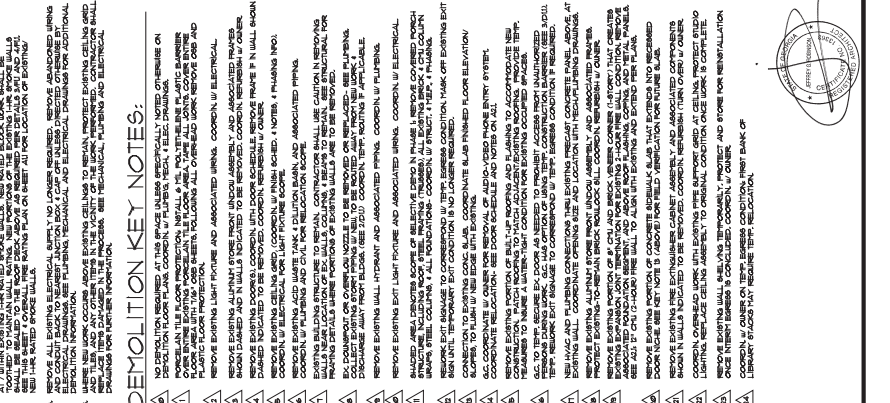
3. TEMPORARY CONSTRUCTION DETAIL

CONG. CAP FILL DET. AT EXISTING CONC. SLAB WHERE EXISTING PIPES ARE REMOVED OR FILLED

4. CONG. CAP FILL DET. AT EXISTING CONC. SLAB WHERE EXISTING PIPES ARE REMOVED OR FILLED

TEMPORARY CONSTRUCTION DETAIL

5. TEMPORARY CONSTRUCTION DETAIL



CUNNINGHAM FORHAND MATHEUS MACE ARCHITECTS, INC.

DEMOLITION LEGEND:

REMOVE EXISTING WALLS
REMOVE EXISTING FLOORING
REMOVE EXISTING ROOFING
REMOVE EXISTING STRUCTURE
REMOVE EXISTING MECHANICAL AND ELECTRICAL EQUIPMENT
REMOVE EXISTING LIGHT FIXTURES AND ASSOCIATED WIRING
REMOVE EXISTING LIGHT FIXTURES AND ASSOCIATED WIRING
REMOVE EXISTING LIGHT FIXTURES AND ASSOCIATED WIRING

OVERALL MAIN LEVEL DEMOLITION PLAN - PHASED WORK

1. OVERALL MAIN LEVEL DEMOLITION PLAN - PHASED WORK

2. WALL REPAIR DETAIL AT EXISTING MAIN LEVEL

3. TEMPORARY CONSTRUCTION DETAIL

CONG. CAP FILL DET. AT EXISTING CONC. SLAB WHERE EXISTING PIPES ARE REMOVED OR FILLED

4. CONG. CAP FILL DET. AT EXISTING CONC. SLAB WHERE EXISTING PIPES ARE REMOVED OR FILLED

TEMPORARY CONSTRUCTION DETAIL

5. TEMPORARY CONSTRUCTION DETAIL

DEMOLITION LEGEND:

REMOVE EXISTING WALLS
REMOVE EXISTING FLOORING
REMOVE EXISTING ROOFING
REMOVE EXISTING STRUCTURE
REMOVE EXISTING MECHANICAL AND ELECTRICAL EQUIPMENT
REMOVE EXISTING LIGHT FIXTURES AND ASSOCIATED WIRING
REMOVE EXISTING LIGHT FIXTURES AND ASSOCIATED WIRING
REMOVE EXISTING LIGHT FIXTURES AND ASSOCIATED WIRING

DATE	REVISION	NO.
10/27/11	BLANK SHEET SET	1
10/27/11	DOE FINAL	2
10/27/11	ADDITION NO. 2	3

FACILITY CODE 667-4596



WALL LEGEND

- 1-HOUR RATED WALL - READY TO ROCK
- 2-HOUR RATED WALL - READY TO ROCK
- 3-HOUR RATED WALL - READY TO ROCK
- 4-HOUR RATED WALL - READY TO ROCK
- 5-HOUR RATED WALL - READY TO ROCK
- 6-HOUR RATED WALL - READY TO ROCK
- 8-HOUR RATED WALL - READY TO ROCK
- 10-HOUR RATED WALL - READY TO ROCK
- 12-HOUR RATED WALL - READY TO ROCK
- 15-HOUR RATED WALL - READY TO ROCK
- 20-HOUR RATED WALL - READY TO ROCK
- 24-HOUR RATED WALL - READY TO ROCK
- 30-HOUR RATED WALL - READY TO ROCK
- 36-HOUR RATED WALL - READY TO ROCK
- 48-HOUR RATED WALL - READY TO ROCK
- 60-HOUR RATED WALL - READY TO ROCK
- 72-HOUR RATED WALL - READY TO ROCK
- 96-HOUR RATED WALL - READY TO ROCK
- 120-HOUR RATED WALL - READY TO ROCK
- 144-HOUR RATED WALL - READY TO ROCK
- 168-HOUR RATED WALL - READY TO ROCK
- 192-HOUR RATED WALL - READY TO ROCK
- 216-HOUR RATED WALL - READY TO ROCK
- 240-HOUR RATED WALL - READY TO ROCK
- 288-HOUR RATED WALL - READY TO ROCK
- 336-HOUR RATED WALL - READY TO ROCK
- 384-HOUR RATED WALL - READY TO ROCK
- 432-HOUR RATED WALL - READY TO ROCK
- 480-HOUR RATED WALL - READY TO ROCK
- 528-HOUR RATED WALL - READY TO ROCK
- 576-HOUR RATED WALL - READY TO ROCK
- 624-HOUR RATED WALL - READY TO ROCK
- 672-HOUR RATED WALL - READY TO ROCK
- 720-HOUR RATED WALL - READY TO ROCK
- 768-HOUR RATED WALL - READY TO ROCK
- 816-HOUR RATED WALL - READY TO ROCK
- 864-HOUR RATED WALL - READY TO ROCK
- 912-HOUR RATED WALL - READY TO ROCK
- 960-HOUR RATED WALL - READY TO ROCK
- 1008-HOUR RATED WALL - READY TO ROCK
- 1056-HOUR RATED WALL - READY TO ROCK
- 1104-HOUR RATED WALL - READY TO ROCK
- 1152-HOUR RATED WALL - READY TO ROCK
- 1200-HOUR RATED WALL - READY TO ROCK

SEE THE SCALE BAR ON
ADJACENT SHEETS FOR ENLARGED
INFORMATION ON WALL TYPES
EXCEPT

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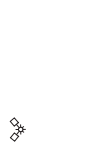
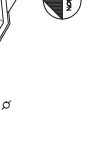
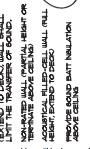
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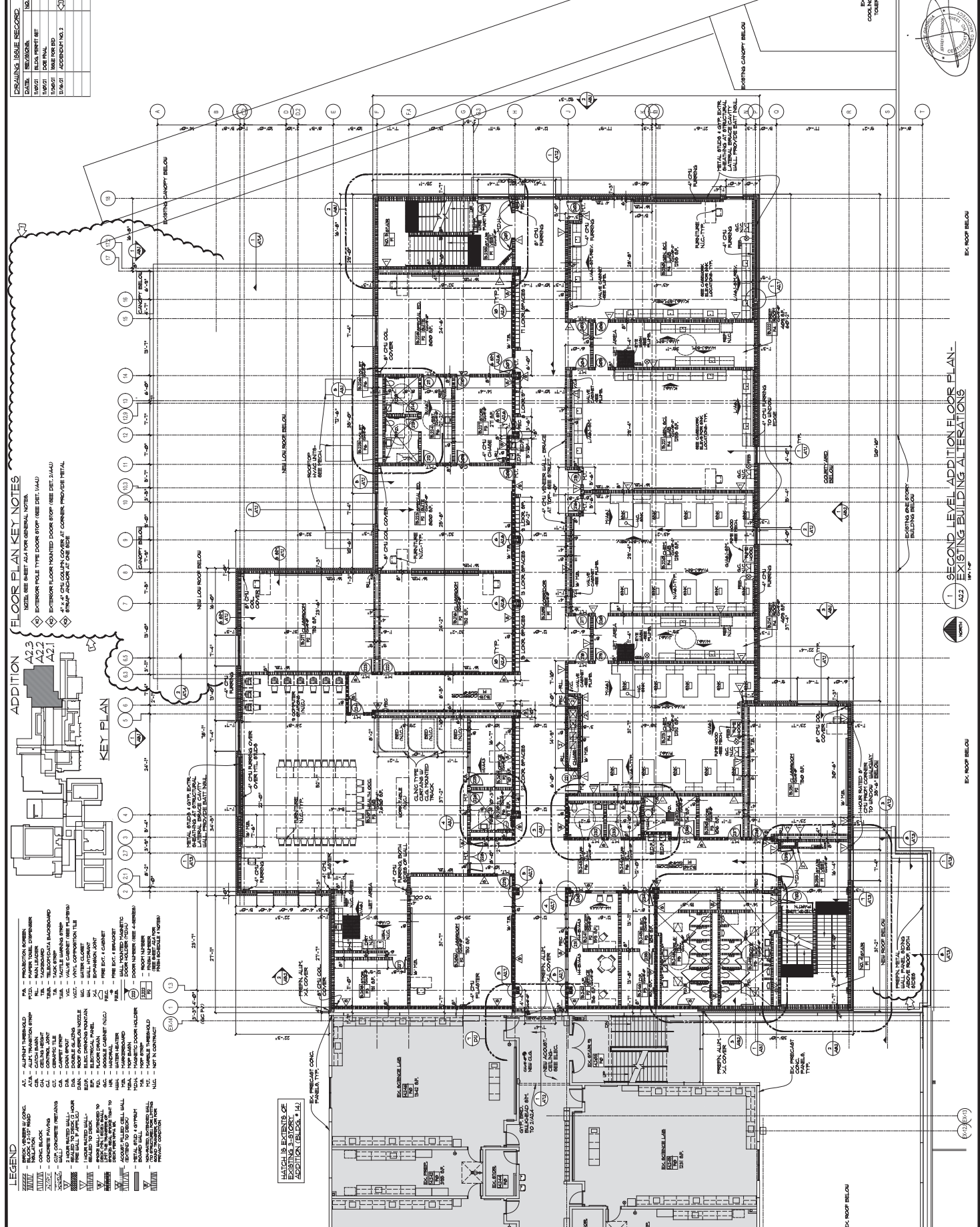
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ADJACENT SHEETS FOR ENLARGED
INFORMATION ON WALL TYPES
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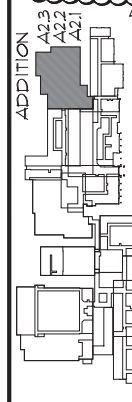
FLOOR PLAN KEY NOTES

NOTES SEE SHEET A2.1 FOR GENERAL NOTES.

1. EXTERIOR WALL TYPE DOOR STOP (SEE DET. 1/4/U)

2. EXTERIOR FLOOR MOUNTED DOOR STOP (SEE DET. 2/4/U)

3. 4\"/>



LEGEND

	AL - ALUMINUM VERTICAL CURTAIN WALL
	BR - BRICK
	CB - CONCRETE BLOCK
	CL - CONCRETE BLOCK
	CM - CONCRETE MASONRY
	CU - CONCRETE BLOCK
	DR - DRAIN
	EA - ELECTRICAL PANEL
	EN - ENCLAVE
	EX - EXTERIOR
	GL - GLASS
	GR - GRANITE
	HA - HOLLOW CORE CONCRETE
	IC - INSULATION
	IB - INSULATION BOARD
	IS - INSULATION
	IT - INSULATION
	JA - JACKET
	LC - LOCK
	LD - LOCKER
	LS - LOCKER
	MA - MASONRY
	MC - MASONRY
	ME - MECHANICAL
	MI - MASONRY
	ML - MASONRY
	MO - MASONRY
	MS - MASONRY
	MT - MASONRY
	NU - NOT IN CONTRACT

WATCH IS EXTENTS OF EXISTING 3-STORY ADDITION (INDICATED)

1 SECOND LEVEL ADDITIONAL FLOOR PLAN - EXISTING BUILDING ALTERATIONS

A2.2
3/1/21

DRAWING ISSUE RECORD

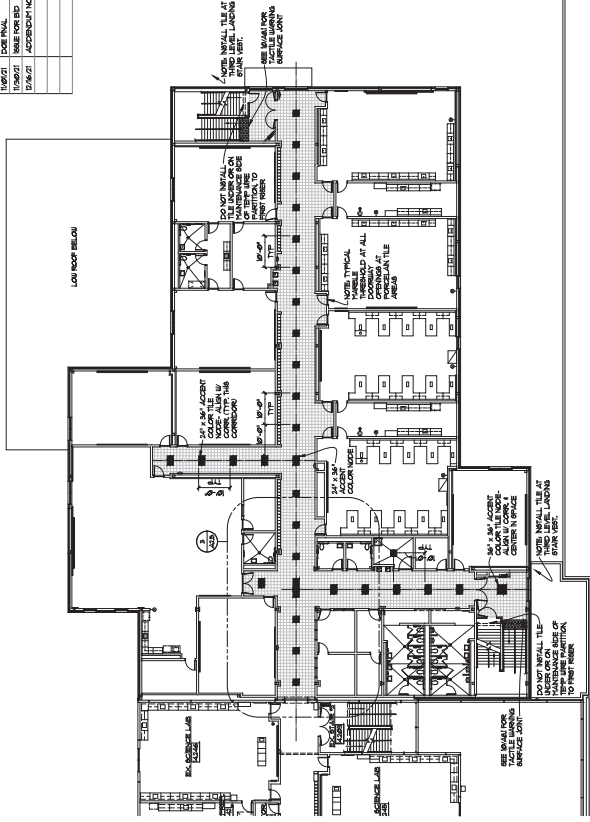
NO.	DATE	REVISION
1	10/07/21	ISSUE FOR PERMIT
2	01/10/22	REVISED PER PERMIT COMMENTS
3	03/01/22	ISSUE FOR PERMIT

FACILITY CODE 661-4596

20 LEVEL CREEK ROAD, SUITE 400
 GWINNETT COUNTY BOARD OF EDUCATION
 GWINNETT COUNTY, GEORGIA

FACILITY CODE 667-4596

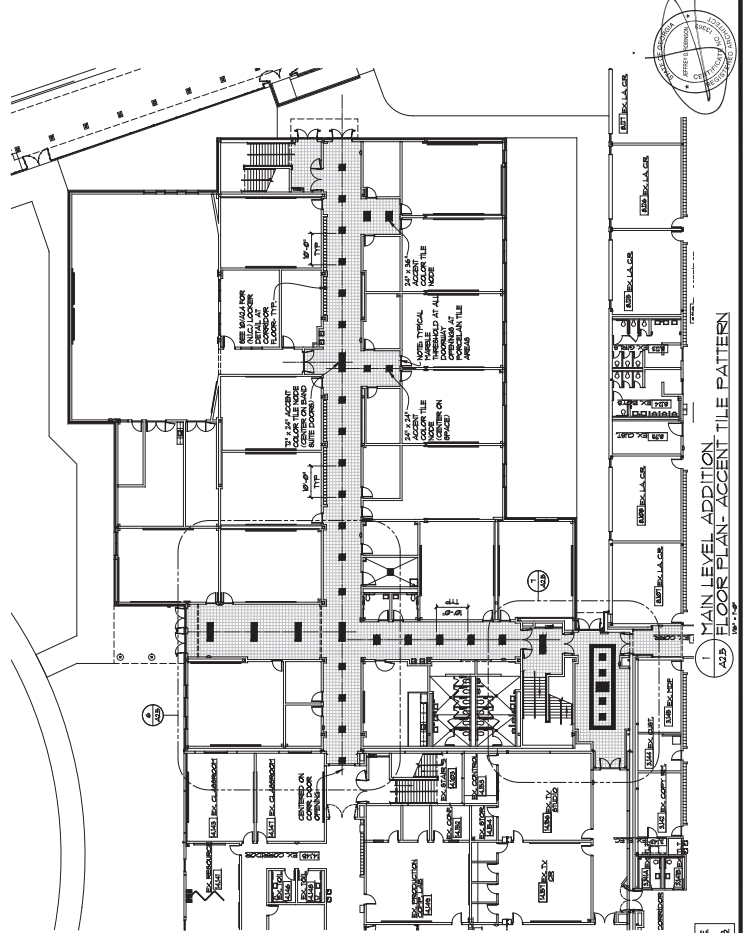
DATE	REVISION	NO.
10/07/12	BLACK PRINT SET	1
10/07/12	DOE FINAL	2
05/01/12	REVISED	3
02/01/12	ADDITIONAL NO. 2	4



SEE COMPLETE FINISH SCHEDULE ON SHEET A2.4 FOR ADDITIONAL INFO AND OTHER LOOKFINISHES

2 SECOND LEVEL ADDITION FLOOR PLAN - ACCENT TILE PATTERN
A2.5

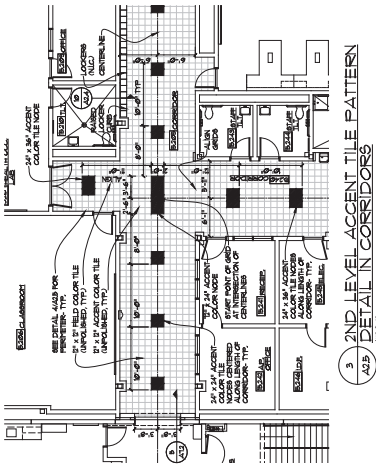
SEE DETAILS A.4, B/A2.2 FOR ADDITIONAL INFO



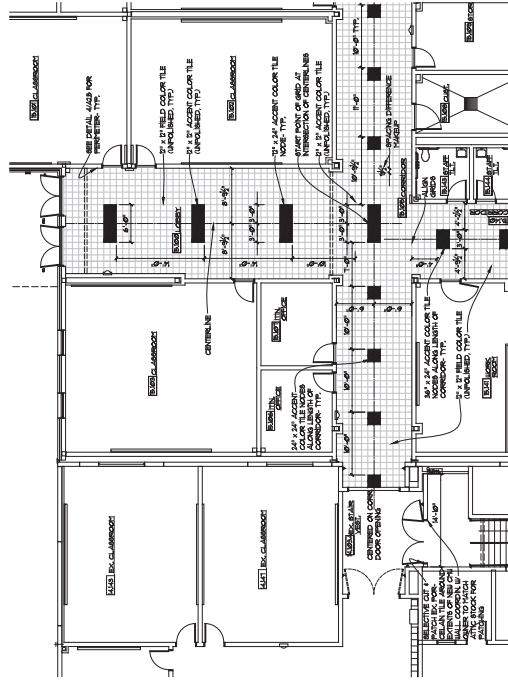
SEE COMPLETE FINISH SCHEDULE ON SHEET A2.4 FOR ADDITIONAL INFO AND OTHER LOOKFINISHES

1 MAIN LEVEL ADDITION FLOOR PLAN - ACCENT TILE PATTERN
A2.5

SEE DETAILS A.4, B/A2.2 FOR ADDITIONAL INFO

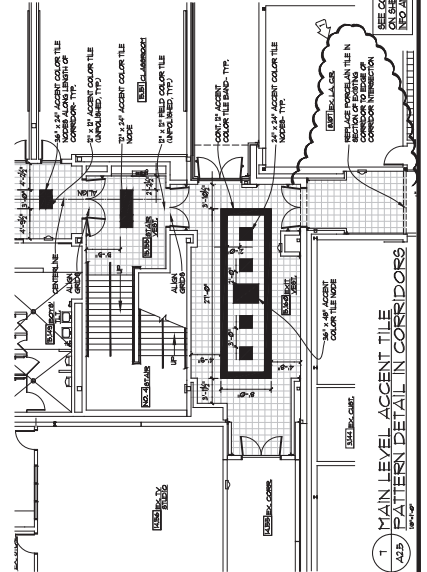


2 2ND LEVEL AGENT TILE PATTERN
A2.5



6 MAIN LEVEL AGENT TILE PATTERN DETAIL IN CORRIDORS
A2.5

SEE DETAILS A.4, B/A2.2 FOR ADDITIONAL INFO



SEE COMPLETE FINISH SCHEDULE ON SHEET A2.4 FOR ADDITIONAL INFO AND OTHER LOOKFINISHES

7 MAIN LEVEL AGENT TILE PATTERN DETAIL IN CORRIDORS
A2.5

SEE DETAILS A.4, B/A2.2 FOR ADDITIONAL INFO

5 TYP. CONTROL & X-JOINT DETAIL
A2.5
FULL SCALE

NOTE: DETAILS A2.5 & A2.6 ARE TYPICAL CONTROL & X-JOINT DETAILS IN TILE CORRIDORS. THEY ARE NOT TO BE USED IN WALLS OR PARTS OF WALLS. CONCRETE SHALL BE FINISHED TO A MINIMUM OF 1/2" BELOW TILE. CONCRETE SHALL BE FINISHED TO A MINIMUM OF 1/2" BELOW TILE. CONCRETE SHALL BE FINISHED TO A MINIMUM OF 1/2" BELOW TILE.

4 PERIMETER TILE X-JOINT DETAIL
A2.5
FULL SCALE

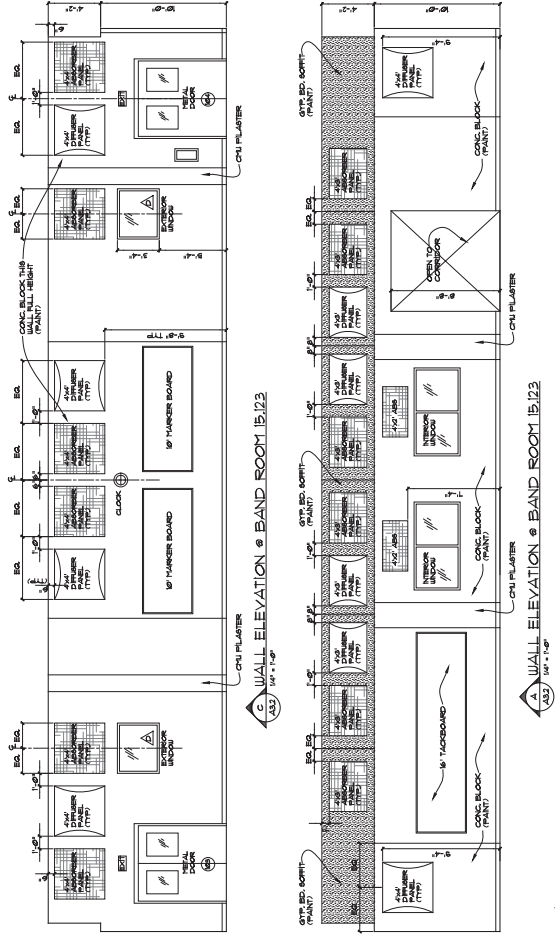
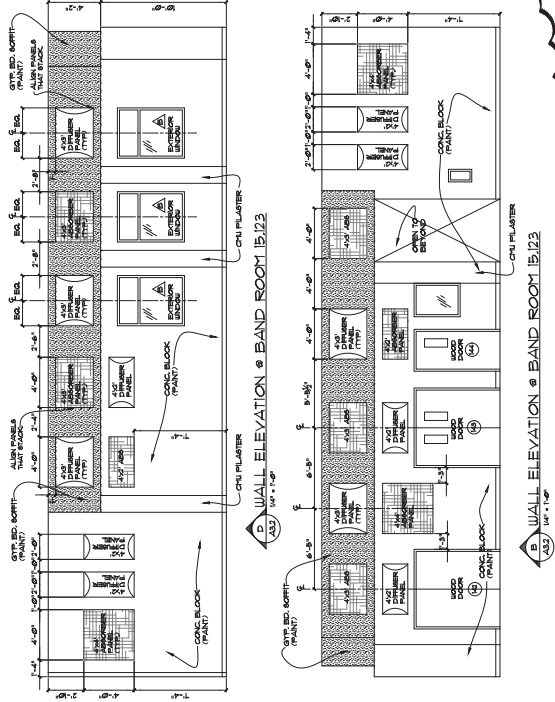
PERIMETER TILE X-JOINT DETAIL



Cunningham Forehand Matthews Moore

NORTH GUNNETT HIGH SCHOOL
EAST ADDITION
FOR
20 LEVEL CREEK ROAD SUWANEE, GA 30024
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FACILITY CODE 667-4596



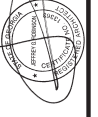
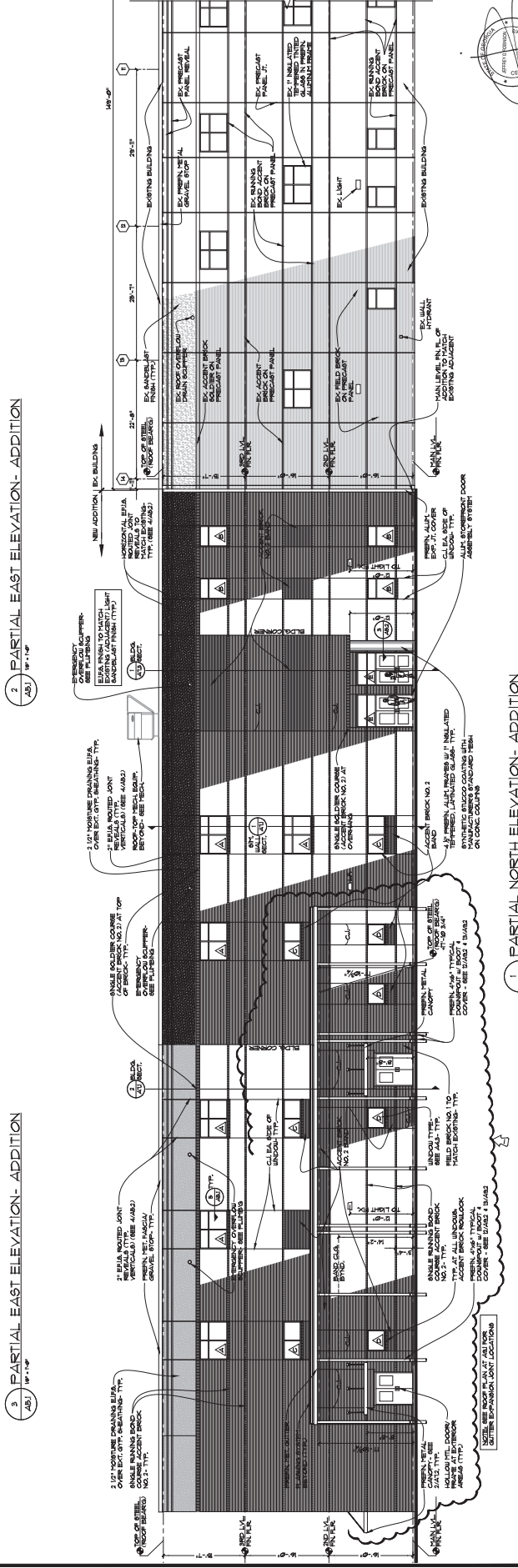
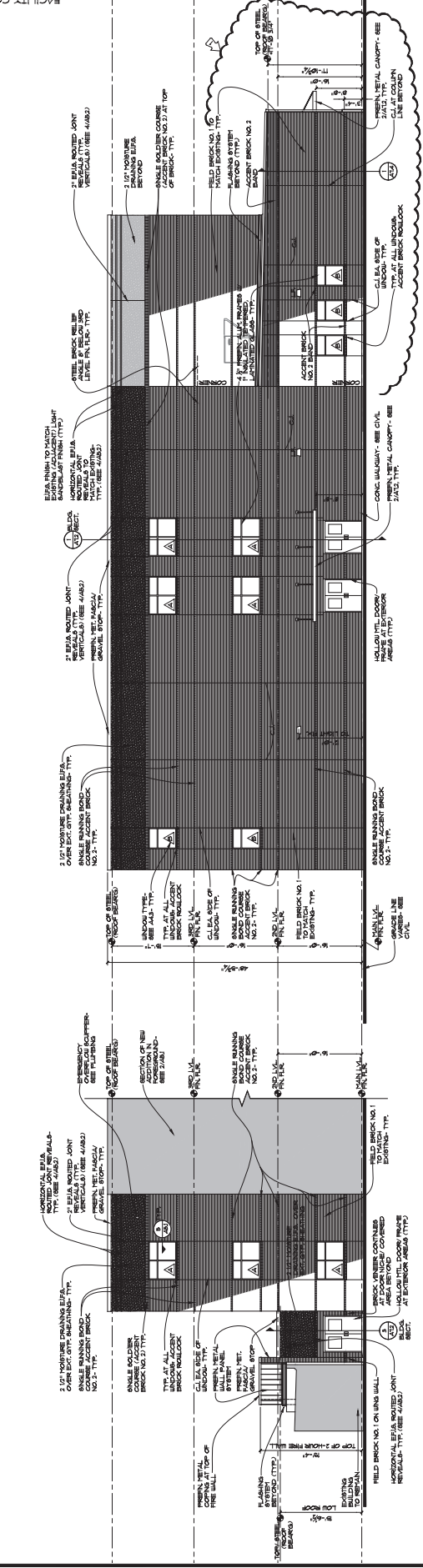
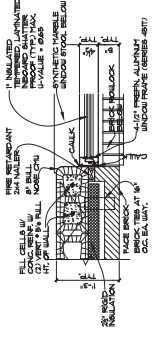
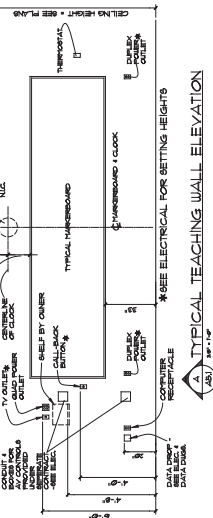
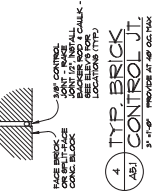
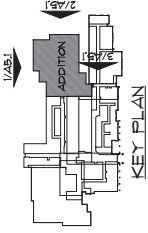
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2	11/07/12	DOE FINAL
3	02/07/13	PERMIT
4	02/07/13	ASSEMBLY NO. 2

DATE	REVISION	NO.
10/07/21	BLANK PERMIT SET	1
10/07/21	DOE FINAL	2
10/07/21	AS-BUILT	3

NORTH GUNNETT HIGH SCHOOL
 EAST ADDITION
 20 LEVEL CREEK ROAD SUWANEE, GA 30024
 GUNNETT COUNTY BOARD OF EDUCATION
 GUNNETT COUNTY, GEORGIA
 841-281-1201
 841-281-1201
 841-281-1201

Cunningham Forhand Mathews & Moore architects, inc. - atlanta, georgia 30324 - phone (404) 873-2152

FACILITY CODE 667-4596



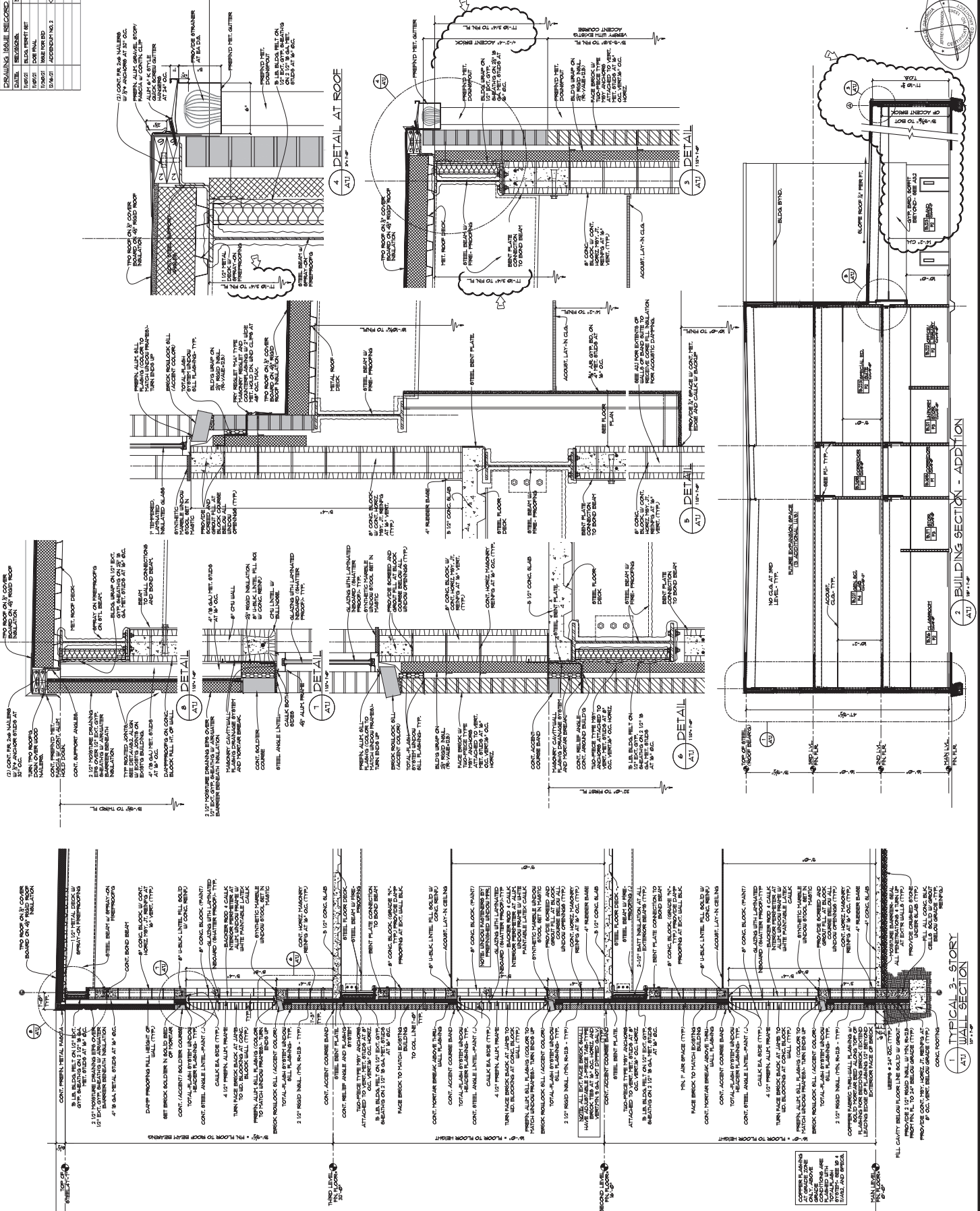
1 PARTIAL NORTH ELEVATION - ADDITION
 1/2" TYPICAL

3 PARTIAL EAST ELEVATION - ADDITION
 1/2" TYPICAL

2 PARTIAL EAST ELEVATION - ADDITION
 1/2" TYPICAL

NO.	DATE	REVISION
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2	11/23/17	DOOR FINISH
3	05/01/18	ACCOMMODATION NO. 2

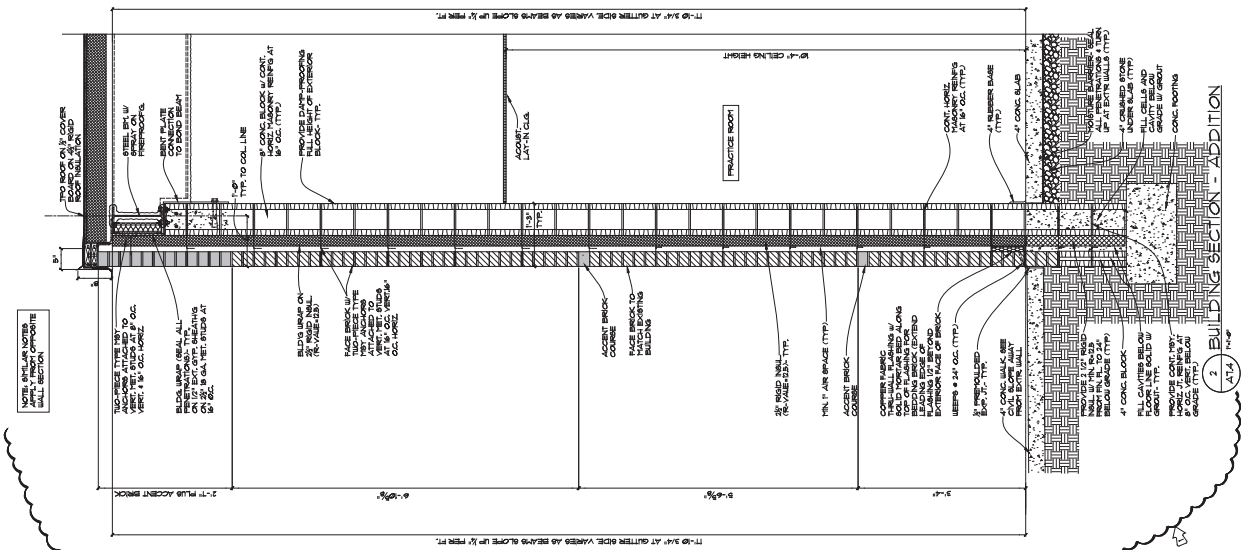
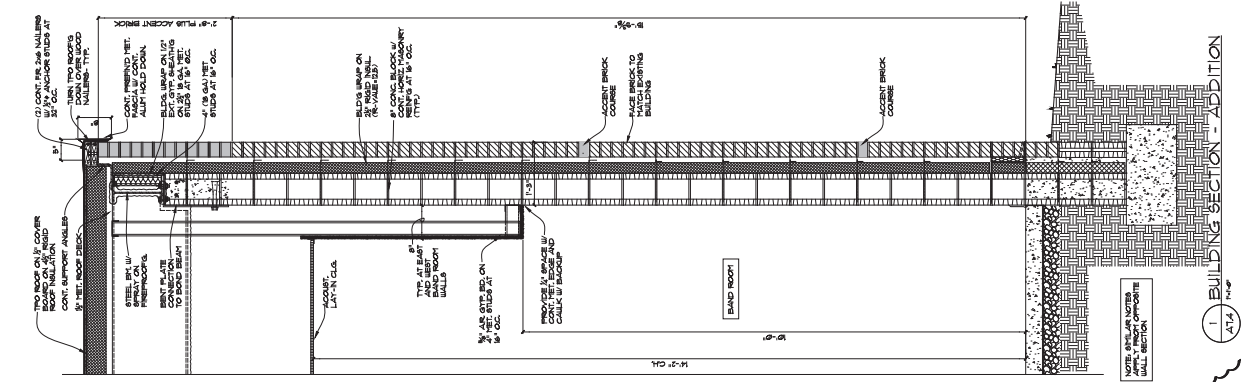
FACILITY CODE 667-4596



FACILITY CODE 667-4556



DATE	REVISION	NO.
10/07/10	BLANK PERMIT SET	1
03/14/11	FOR PERMIT	2
03/14/11	AS SHOWN	3



1 BUILDING SECTION - ADDITION
A7.4

2 BUILDING SECTION - ADDITION
A7.4

GENERAL NOTES:

- ① GUTTERS AND LOCATION OF ROOF TOP MECHANICAL EQUIPMENT ARE APPROXIMATE. SEE CONTRACTOR MOST COORDINATE EXACT ITEMS AS WELL AS SIZE AND LOCATION OF OPENINGS FOR STRUCTURAL SUPPORT AND ROOF SLOPE TO PROVIDE POSITIVE DRAINAGE. AROUND ALL ROOF TOP EQUIPMENT AS NECESSARY, PROVIDE CRACKERS AS REQUIRED.
- ② CONTRACTOR TO PROVIDE POSITIVE DRAINAGE TO ALL ROOF DRAINS AND GUTTERS AS SHOWN.
- ③ PROVIDE ROOF DRAIN CRACKERS TO ALL ROOF DRAINS AND GUTTERS AS SHOWN.
- ④ PROVIDE ROOF DRAIN CRACKERS TO ALL ROOF DRAINS AND GUTTERS AS SHOWN.
- ⑤ COORDINATE FINAL LOCATIONS OF OVERFLOW DRAIN DISCHARGE LOCATIONS ON ELEVATIONS WITH ARCHITECT. DO NOT SCALE LOCATIONS FROM ROOF PLAN OR FROM PLUMBING PLAN. USE SIZE AND OVERFLOW DETAIL.
- ⑥ PROVIDE ROOF DRAIN CRACKERS TO ALL ROOF DRAINS AND GUTTERS AS SHOWN.
- ⑦ DO NOT ALLOW PLUMBING PERMITS TO BE OBTAINED FOR ANY ROOF TOP OR MECHANICAL EQUIPMENT WITHOUT THE CONTRACTOR'S APPROVAL. PROVIDE CLEARANCE TO ALL MECHANICAL EQUIPMENT. PROVIDE PROTECTIVE GRATES OR COVERS TO ALL ROOF TOP MECHANICAL EQUIPMENT.
- ⑧ ALL ROOF PENETRATIONS INCLUDING VENT & STACK EXHAUST CANS AND PIPE CRACKERS BOTH EXISTING AND NEW SHALL BE PENETRATED THROUGH THE ROOF WITH A WATER TIGHT FLASHING. ALL FLASHINGS SHALL BE INSTALLED WITH INSULATION ABOVE THE FLASHING. FLASHINGS SHALL BE INSTALLED WITH INSULATION ABOVE THE FLASHING. FLASHINGS SHALL BE INSTALLED WITH INSULATION ABOVE THE FLASHING. FLASHINGS SHALL BE INSTALLED WITH INSULATION ABOVE THE FLASHING.

ROOF PLAN LEGEND

X-11: BUILDING ELEVATION LINE (SEE 2/A&3)
 X-12: BUILDING ROOF ELEVATION LINE (SEE 2/A&3)
 X-13: NEW ROOF DRAIN (SEE 2/A&3)
 X-14: EXISTING ROOF DRAIN (SEE 2/A&3)
 X-15: ROOF DRAIN CRACKER (SEE 2/A&3)
 X-16: ROOF DRAIN CRACKER (SEE 2/A&3)
 X-17: ROOF DRAIN CRACKER (SEE 2/A&3)
 X-18: ROOF DRAIN CRACKER (SEE 2/A&3)
 X-19: ROOF DRAIN CRACKER (SEE 2/A&3)
 X-20: ROOF DRAIN CRACKER (SEE 2/A&3)
 X-21: ROOF DRAIN CRACKER (SEE 2/A&3)
 X-22: ROOF DRAIN CRACKER (SEE 2/A&3)
 X-23: ROOF DRAIN CRACKER (SEE 2/A&3)
 X-24: ROOF DRAIN CRACKER (SEE 2/A&3)
 X-25: ROOF DRAIN CRACKER (SEE 2/A&3)

3 OVERFLOW DRAIN DISCHARGE DET.

15-10-10

4 DET. FOR PIPES THRU ROOF

15-10-10

2 SECT. THRU TYP. GUTTER EXPANSION JOINT

15-10-10

1 OVERALL & ADDITION ROOF PLAN

15-10

3 OVERFLOW DRAIN DISCHARGE DET.

15-10-10

4 DET. FOR PIPES THRU ROOF

15-10-10



DRAWING ISSUE RECORD

NO.	DATE	DESCRIPTION
1	11/07/21	ISSUE FOR PERMIT
2	12/02/21	ISSUE FOR PERMIT

NORTH GUNNETT HIGH SCHOOL EAST ADDITION

20 LEVEL CREEK ROAD, SUWANEE, GA 30024

QUINNT COUNTY, GEORGIA

20 LEVEL CREEK ROAD, SUWANEE, GA 30024

QUINNT COUNTY, GEORGIA

QUINNT COUNTY BOARD OF EDUCATION

20 LEVEL CREEK ROAD, SUWANEE, GA 30024

QUINNT COUNTY, GEORGIA

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QUINNT COUNTY, GEORGIA

20 LEVEL CREEK ROAD, SUWANEE, GA 30024

QUINNT COUNTY, GEORGIA

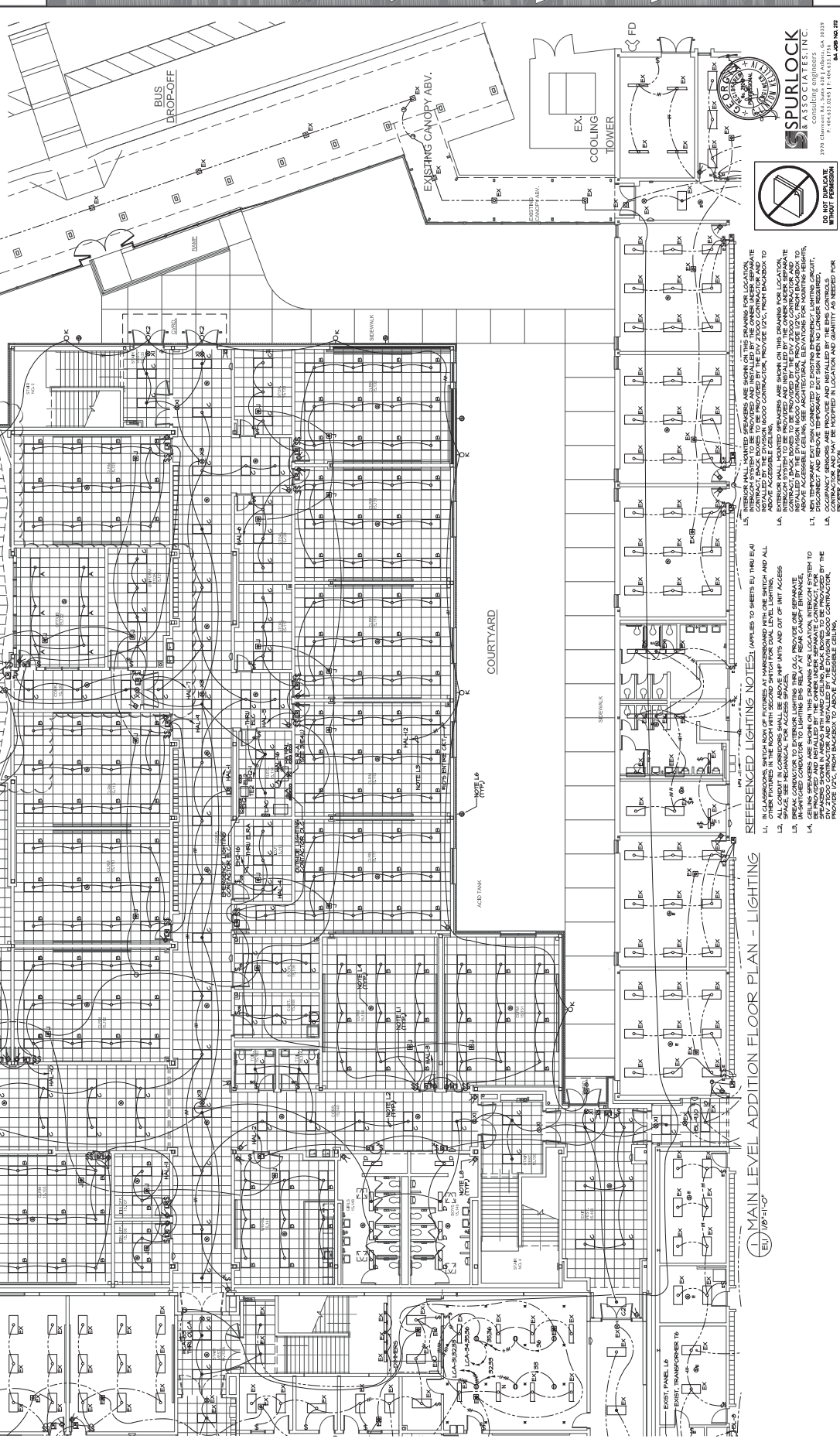
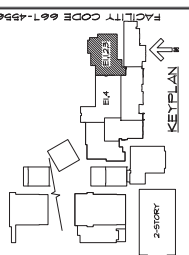
ARCHITECTS, INC. - atlanta, georgia 30324 - phone (404) 873-2152

cunningham, forhand, mathews & moore, architects, inc. - 2011 manchester street, n.e. - atlanta, georgia 30324 - phone (404) 873-2152

20 LEVEL CREEK ROAD, SUWANEE, GA 30024

QUINNT COUNTY, GEORGIA

DATE	REVISION	NO.
	APPROVED FOR SET	
	REVISED FOR SET	
	REVISED FOR SET	
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	REVISED FOR SET	



cunningham fehrnd matheus moe

NORTH GWINNETT HIGH SCHOOL
EAST ADDITION
20 LEVEL CREEK ROAD, SUWANEE, GA 30024
GWINNETT COUNTY BOARD OF EDUCATION
GWINNETT COUNTY, GEORGIA

cunningham, fohrhard, foehnd, matheus & moore, architects, inc. - 2011 manchester street, n.e. - atlanta, georgia 30324 - phone (404) 873-2152
DATE: MARCH 1, 2007
DRAWN BY: GTR
CHECKED BY: GTR
SCALE: AS SHOWN



SPURLOCK & ASSOCIATES, INC.
consulting engineers, pc
1370 BUCKLEBOURNE DRIVE, SUITE 100
SUWANEE, GEORGIA 30024
PHONE: (770) 381-1111
FAX: (770) 381-1114
WWW.SPURLOCK-AND-ASSOCIATES.COM
LICENSED PROFESSIONAL ENGINEER
STATE OF GEORGIA
NO. 11887

- REFERENCED LIGHTING NOTES:**
- 1. ALL LIGHTING FIXTURES SHALL BE ABOVE HUNG UNLESS OTHERWISE NOTED.
 - 2. ALL LIGHTING FIXTURES SHALL BE ABOVE HUNG UNLESS OTHERWISE NOTED.
 - 3. BREAK CONNECTORS TO EXTERIOR LIGHTING SHALL BE PROVIDED BY THE DIVISION 27000 CONTRACTOR AND INSTALLED BY THE DIVISION 27000 CONTRACTOR.
 - 4. BREAK CONNECTORS TO EXTERIOR LIGHTING SHALL BE PROVIDED BY THE DIVISION 27000 CONTRACTOR AND INSTALLED BY THE DIVISION 27000 CONTRACTOR.
 - 5. BREAK CONNECTORS TO EXTERIOR LIGHTING SHALL BE PROVIDED BY THE DIVISION 27000 CONTRACTOR AND INSTALLED BY THE DIVISION 27000 CONTRACTOR.
 - 6. BREAK CONNECTORS TO EXTERIOR LIGHTING SHALL BE PROVIDED BY THE DIVISION 27000 CONTRACTOR AND INSTALLED BY THE DIVISION 27000 CONTRACTOR.

MAIN LEVEL ADDITION FLOOR PLAN - LIGHTING
E1.107-1-C

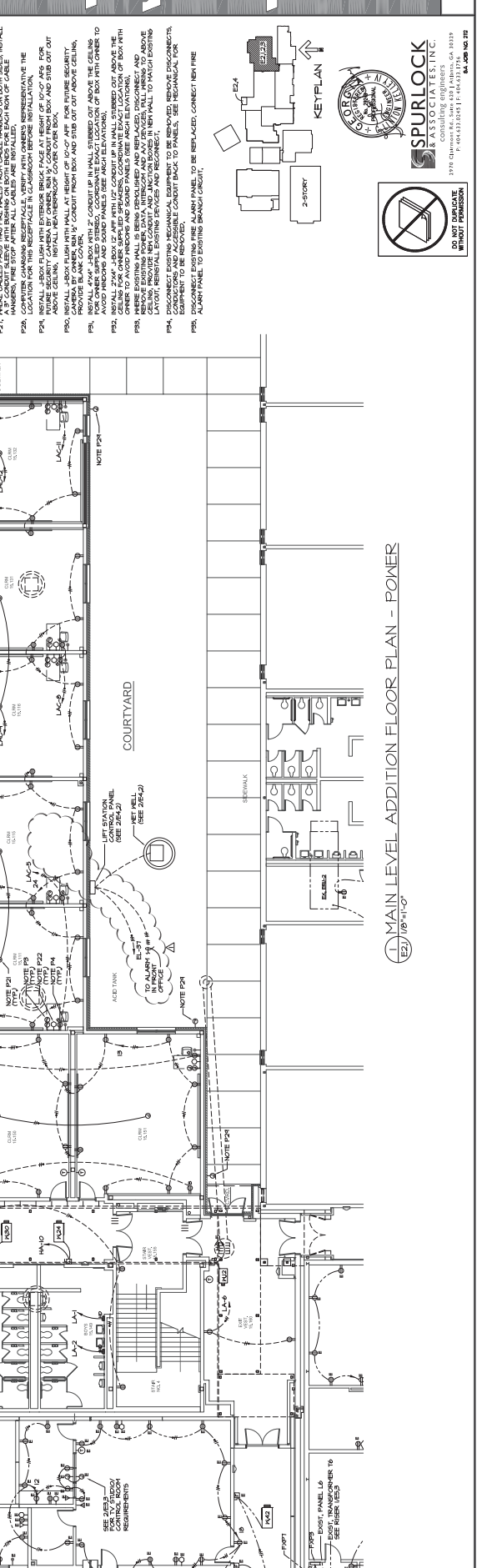
NORTH GUINNETT HIGH SCHOOL EAST ADDITION 20 LEVEL CREEK ROAD SUWANEE, GA 30024

Cunningham, Forehand, Mathews & Moore, Architects, Inc. - 2011 Manchester Street, N.E. - Atlanta, Georgia 30324 - Phone (404) 873-2152
 MARCH 1, 2007
 SHEET 1 OF 12
 DRAWN BY: G.M.
 CHECKED BY: G.M.
 DATE: 03/01/07

NO.	DATE	REVISION
1	03/01/07	AS NOTED
2	03/01/07	REVISED FOR PERMITS
3	03/01/07	REVISED FOR PERMITS
4	03/01/07	REVISED FOR PERMITS
5	03/01/07	REVISED FOR PERMITS
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7	03/01/07	REVISED FOR PERMITS
8	03/01/07	REVISED FOR PERMITS
9	03/01/07	REVISED FOR PERMITS
10	03/01/07	REVISED FOR PERMITS

REFERENCED POWER NOTES: (APPLIES TO SHEETS E2.1 THRU E2.4)

- P1. DO NOT INSTALL ANY OUTLETS BACK TO BACK.
- P2. SEE DETAIL A-1 FOR ALL ELECTRICAL WORK.
- P3. SEE DETAIL A-2 FOR ALL ELECTRICAL WORK.
- P4. SEE DETAIL A-3 FOR ALL ELECTRICAL WORK.
- P5. SEE DETAIL A-4 FOR ALL ELECTRICAL WORK.
- P6. SEE DETAIL A-5 FOR ALL ELECTRICAL WORK.
- P7. SEE DETAIL A-6 FOR ALL ELECTRICAL WORK.
- P8. SEE DETAIL A-7 FOR ALL ELECTRICAL WORK.
- P9. SEE DETAIL A-8 FOR ALL ELECTRICAL WORK.
- P10. SEE DETAIL A-9 FOR ALL ELECTRICAL WORK.
- P11. SEE DETAIL A-10 FOR ALL ELECTRICAL WORK.
- P12. SEE DETAIL A-11 FOR ALL ELECTRICAL WORK.
- P13. SEE DETAIL A-12 FOR ALL ELECTRICAL WORK.
- P14. SEE DETAIL A-13 FOR ALL ELECTRICAL WORK.
- P15. SEE DETAIL A-14 FOR ALL ELECTRICAL WORK.
- P16. SEE DETAIL A-15 FOR ALL ELECTRICAL WORK.
- P17. SEE DETAIL A-16 FOR ALL ELECTRICAL WORK.
- P18. SEE DETAIL A-17 FOR ALL ELECTRICAL WORK.
- P19. SEE DETAIL A-18 FOR ALL ELECTRICAL WORK.
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- P66. SEE DETAIL A-65 FOR ALL ELECTRICAL WORK.
- P67. SEE DETAIL A-66 FOR ALL ELECTRICAL WORK.
- P68. SEE DETAIL A-67 FOR ALL ELECTRICAL WORK.
- P69. SEE DETAIL A-68 FOR ALL ELECTRICAL WORK.
- P70. SEE DETAIL A-69 FOR ALL ELECTRICAL WORK.
- P71. SEE DETAIL A-70 FOR ALL ELECTRICAL WORK.
- P72. SEE DETAIL A-71 FOR ALL ELECTRICAL WORK.
- P73. SEE DETAIL A-72 FOR ALL ELECTRICAL WORK.
- P74. SEE DETAIL A-73 FOR ALL ELECTRICAL WORK.
- P75. SEE DETAIL A-74 FOR ALL ELECTRICAL WORK.
- P76. SEE DETAIL A-75 FOR ALL ELECTRICAL WORK.
- P77. SEE DETAIL A-76 FOR ALL ELECTRICAL WORK.
- P78. SEE DETAIL A-77 FOR ALL ELECTRICAL WORK.
- P79. SEE DETAIL A-78 FOR ALL ELECTRICAL WORK.
- P80. SEE DETAIL A-79 FOR ALL ELECTRICAL WORK.
- P81. SEE DETAIL A-80 FOR ALL ELECTRICAL WORK.
- P82. SEE DETAIL A-81 FOR ALL ELECTRICAL WORK.
- P83. SEE DETAIL A-82 FOR ALL ELECTRICAL WORK.
- P84. SEE DETAIL A-83 FOR ALL ELECTRICAL WORK.
- P85. SEE DETAIL A-84 FOR ALL ELECTRICAL WORK.
- P86. SEE DETAIL A-85 FOR ALL ELECTRICAL WORK.
- P87. SEE DETAIL A-86 FOR ALL ELECTRICAL WORK.
- P88. SEE DETAIL A-87 FOR ALL ELECTRICAL WORK.
- P89. SEE DETAIL A-88 FOR ALL ELECTRICAL WORK.
- P90. SEE DETAIL A-89 FOR ALL ELECTRICAL WORK.
- P91. SEE DETAIL A-90 FOR ALL ELECTRICAL WORK.
- P92. SEE DETAIL A-91 FOR ALL ELECTRICAL WORK.
- P93. SEE DETAIL A-92 FOR ALL ELECTRICAL WORK.
- P94. SEE DETAIL A-93 FOR ALL ELECTRICAL WORK.
- P95. SEE DETAIL A-94 FOR ALL ELECTRICAL WORK.
- P96. SEE DETAIL A-95 FOR ALL ELECTRICAL WORK.
- P97. SEE DETAIL A-96 FOR ALL ELECTRICAL WORK.
- P98. SEE DETAIL A-97 FOR ALL ELECTRICAL WORK.
- P99. SEE DETAIL A-98 FOR ALL ELECTRICAL WORK.
- P100. SEE DETAIL A-99 FOR ALL ELECTRICAL WORK.



MAIN LEVEL ADDITION FLOOR PLAN - POWER

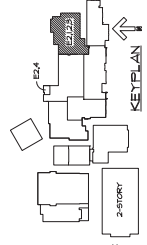
SCALE: 1/8" = 1'-0"

SPURLOCK & ASSOCIATES, INC.
 consulting engineers, architects, interior designers, landscape architects
 11700 Peachtree Dunwoody Rd., Suite 100
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DATE	REVISIONS	NO.
	PROPOSED CHECK SET	
	ISSUE FOR PERMIT SET	
	ISSUE FOR BIDDING	
	ISSUE FOR CONSTRUCTION	
	ISSUE FOR RECORD SET	
	ISSUE FOR AS-BUILT	
	ISSUE FOR ARCHIVE NO. 2	

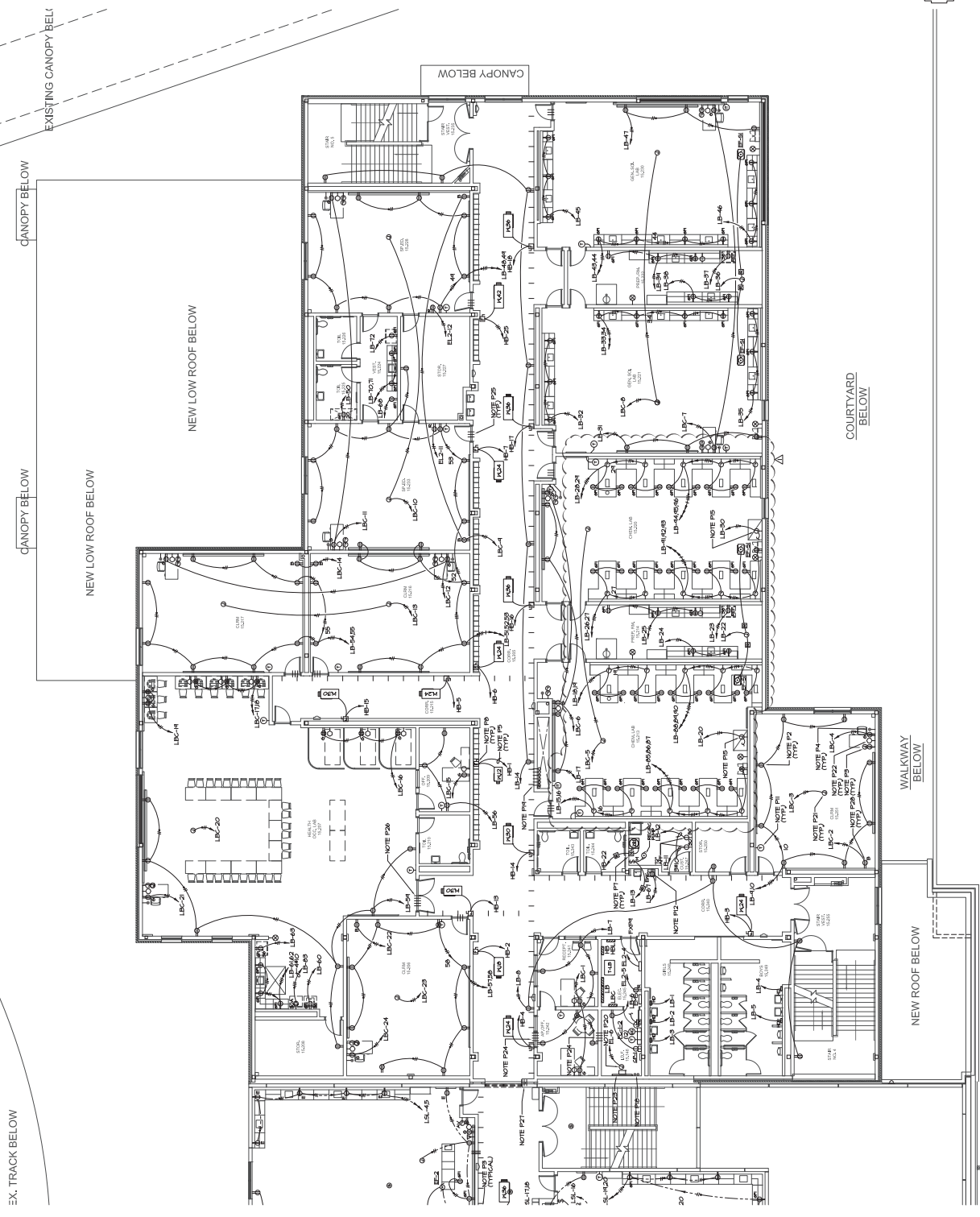
FACILITY CODE 66T-1596



SPURLOCK & ASSOCIATES, INC.
 Consulting Engineers, GA 30135
 1370 Old Peachtree Road, N.E.
 Atlanta, Georgia 30309
 P: 404.318.5151 F: 404.318.1176
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SEE SHEET E2.1 FOR REFERENCED POWER NOTES.



1 SECOND LEVEL ADDITION FLOOR PLAN - POWER
 E2.2 1/8"=1'-0"

DATE	REVISION
11/15/2021	REV. CHANGES SET
11/15/2021	REV. PANEL SET
11/15/2021	REV. WIRING
11/15/2021	REV. PANELS
11/15/2021	REV. WIRING
11/15/2021	REV. PANELS
11/15/2021	REV. WIRING
11/15/2021	REV. PANELS
11/15/2021	REV. WIRING
11/15/2021	REV. PANELS

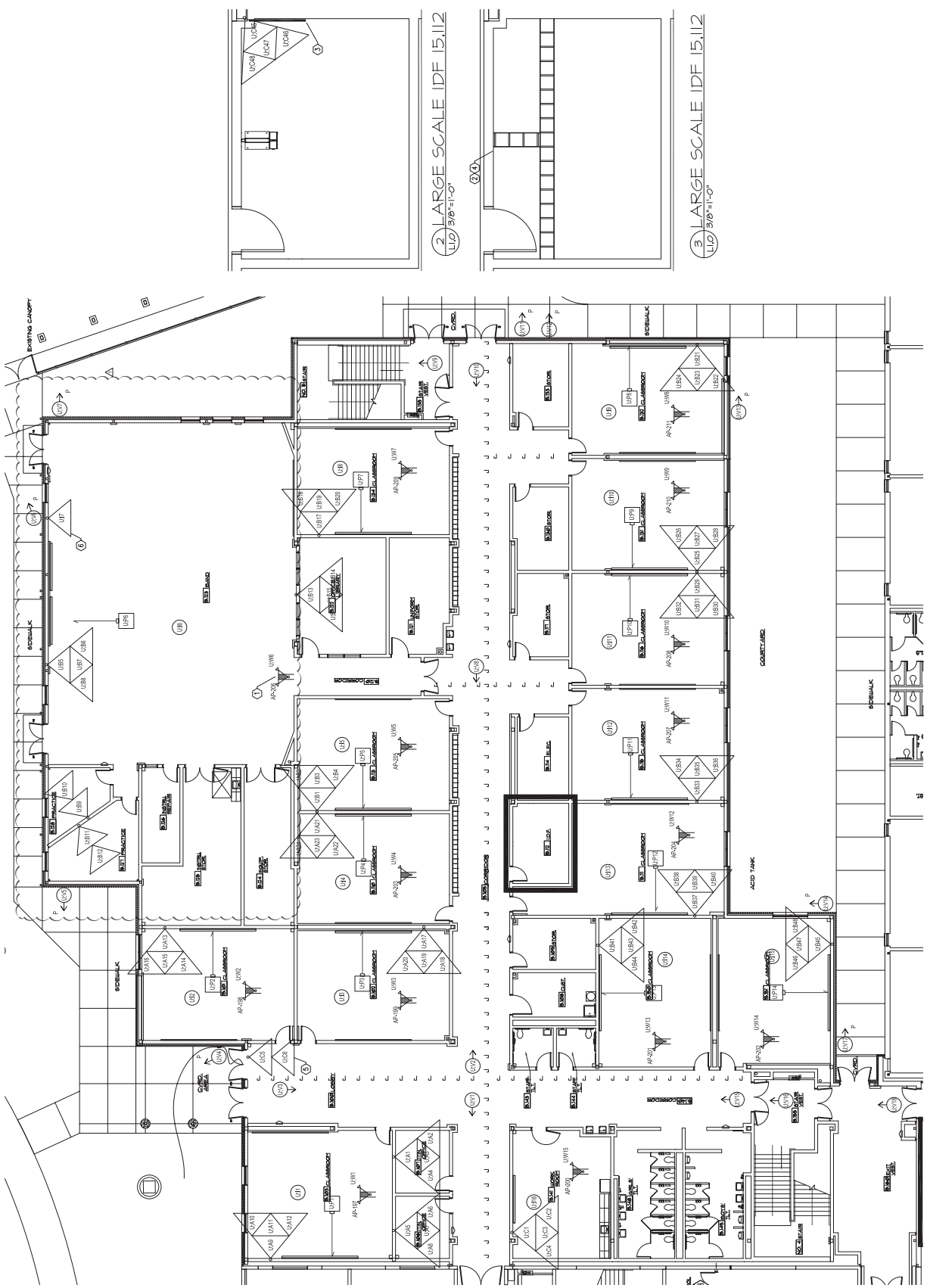
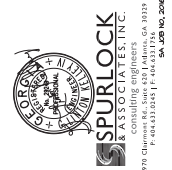
FACILITY CODE 66T-1556

NORTH GWINNETT HIGH SCHOOL
EAST ADDITION
20 LEVEL CREEK ROAD, SUWANEE, GA 30024
GWINNETT COUNTY BOARD OF EDUCATION
GWINNETT COUNTY, GEORGIA

Cunningham Federal Mathews Moore

Cunningham, Forehand, Mathews & Moore, Architects, Inc. - 2011 Manchester Street, N.E. - Atlanta, Georgia 30324 - Phone (404) 873-2152

L1.0



1.0 MAIN LEVEL ADDITION IDF U DATA PLAN
1/10" / 8'-0" = 1'-0"

- KEYNOTES:**
- DIV 27 TO PROVIDE & INSTALL GERBON 1016-C ENCLOSURE. PLACE DROP LABEL ON THE INSIDE COVER.
 - DIV 26 WILL PROVIDE 1-20AMP CIRCUIT ABOVE CEILING.
 - REFER TO IDF ENDS BACK BOARD DETAIL.
 - DIV 26 WILL PROVIDE PENETRATIONS INTO IDF. SEE CONDUIT DETAIL.
 - LEAVE DROPS ABOVE CEILING WITH 20FT SERVICE LOOP. ALSO INSTALL 1-18/2 CONDUCTOR CABLE FROM IDF TO DOOR WITH 20FT SERVICE LOOP ON EACH END.
 - THIS DROP IS TO BE YELLOW HORIZONTAL CABLE WITH YELLOW JACK.

GENERAL NOTES:

- PLACE WIRELESS PROJECTOR & INTERCOM DROPS IN THE CTR OF THE CLASSROOMS. WIRELESS DROP IS TO BE INSTALLED IN A SEPARATE BISCUIT BOX.

DATE	REVISION	NO.
11/15/2011	REV. CHANGES SET	1
11/15/2011	REV. OWNER SET	2
11/15/2011	REV. OWNER SET	3
11/15/2011	REV. OWNER SET	4
11/15/2011	REV. OWNER SET	5
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11/15/2011	REV. OWNER SET	8
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11/15/2011	REV. OWNER SET	98
11/15/2011	REV. OWNER SET	99
11/15/2011	REV. OWNER SET	100

FACILITY CODE 66T-1556

NORTH GWINNETT HIGH SCHOOL
EAST ADDITION
20 LEVEL CREEK ROAD, SUWANEE, GA 30024
GWINNETT COUNTY BOARD OF EDUCATION
GWINNETT COUNTY, GEORGIA

cunningham fehr and mathews mae
cunningham, fehrand, mathews & moore, architects, inc. - 2011 manchester street, n.e. - atlanta, georgia 30324 - phone (404) 873-2152

L3.0



1 MAIN LEVEL ADDITION INTERCOM PLAN
L3.0 1/8"=1'-0"

TO

PLANS AND SPECIFICATIONS

FOR CONSTRUCTION OF

NORTH GWINNETT HIGH SCHOOL

EAST ADDITION

FOR

GWINNETT COUNTY BOARD OF EDUCATION
GWINNETT COUNTY, GA

DATED: MARCH 1, 2021

SHL-D01-21

CUNNINGHAM FOREHAND MATTHEWS & MOORE, ARCHITECTS, INC.
2011 MANCHESTER STREET, N. E.
ATLANTA, GEORGIA 30324
(404) 873-2152

The following items shall take precedence over the plans and specifications (Project Manual) for the above named project and shall become a part of the Contract Documents.

Where any items called for in the specifications or indicated on the drawings are supplemented hereby, the original shall remain in effect.

Where any original item is amended, voided, or superseded hereby, the provisions of such item not specifically amended voided, or superseded shall remain in effect.

The following items shall be incorporated in the Plans and Project Manual.

A. PROJECT MANUAL:

ITEM NO. 1: SECTION 024600, AGGREGATE PIER SOIL IMPROVEMENT:

At PART 1 - GENERAL, SUBSURFACE EXPLORATION REPORT:, at sentence that begins "Contractors desiring a copy of the Subsurface Soils Report..." change the contact information to:

"Michael McKenzie with Nova Engineering (mmckenzie@usanova.com)"

B. DRAWINGS:

ITEM NO. 1: DRAWING PD0.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 2: DRAWING P0.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 3: DRAWING P0.2:

Replace drawing with revised drawing attached herein.

ITEM NO. 4: DRAWING P1.4:

Replace drawing with revised drawing attached herein.

ITEM NO. 5: DRAWING P2.3:

Replace drawing with revised drawing attached herein.

ITEM NO. 6: DRAWING E2.1:

Replace drawing with revised drawing attached herein.

ITEM NO. 7: DRAWING E2.4:

Replace drawing with revised drawing attached herein.

ITEM NO. 8: DRAWING E4.2:

Replace drawing with revised drawing attached herein.

C. PRODUCT AND/OR MANUFACTURER APPROVAL:

ITEMNO. 1: The following manufacturers/products, complying with specifications, are acceptable for this project.

<u>SPECIFICATIONS</u>	<u>PRODUCT</u>	<u>MANUFACTURER</u>
Section 114800	Science Laboratory Equipment	Campbell-Rhea

End of Addendum No. 1

Cunningham Federal Mathews Moore

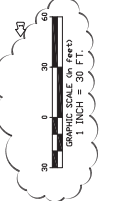
Cunningham, Forehand, Mathews & Moore, Architects, Inc. - 2011 Manchester Street, N.E. - Atlanta, Georgia 30324 - Phone (404) 873-2152
FACILITY CODE 66T-4596
DISTRICT 7, LAND LOT 201, PARCEL 015



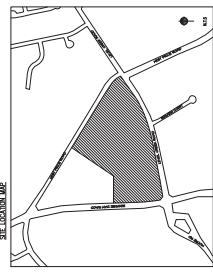
SPURLOCK & ASSOCIATES, INC.
CONSULTING ENGINEERS
3100 DANFORTH ROAD, SUITE 100, RALEIGH, NC 27604
P: 919-873-8100 F: 919-873-8101
WWW.SPURLOCK-AND-ASSOCIATES.COM



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NO ALCOHOL
NO DRUGS
NO WEAPONS
NO GAMING
NO FIREARMS
NO FIREWORKS
NO OPEN FLAMES
NO VAPORIZERS
NO E-CIGARETTES
NO BONGS
NO PIPE
NO CIGARETTES
NO TOBACCO
NO CIGARETTE LIGHTERS
NO MATCHES
NO LIGHTERS
NO CIGARETTE CASES
NO CIGARETTE PACKS
NO CIGARETTE BUTTS
NO CIGARETTE STUBS
NO CIGARETTE TIPS
NO CIGARETTE FILTERS
NO CIGARETTE PAPER
NO CIGARETTE WRAP
NO CIGARETTE BOXES
NO CIGARETTE PACKS
NO CIGARETTE BUTTS
NO CIGARETTE STUBS
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NO CIGARETTE WRAP
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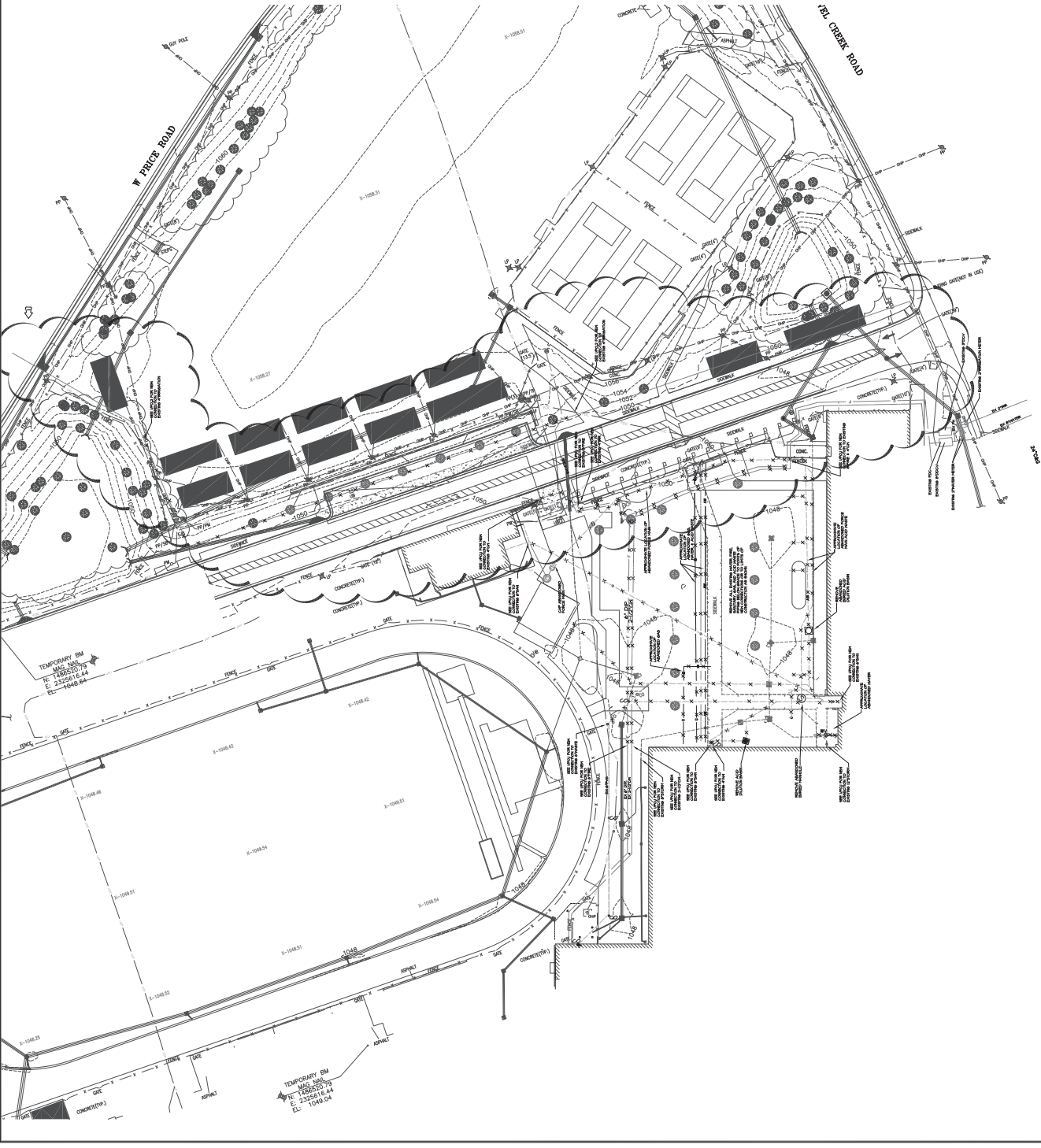


1 SITE PLAN - PLUMBING - DEMO
SCALE: 1" = 30'



PROVIDER:
CUNNINGHAM FEDERAL MATHIEWS MOORE
ARCHITECTS, INC.
2011 MANCHESTER STREET, N.E.
ATLANTA, GEORGIA 30324
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FAX: (404) 873-2151
WWW.CFMMA.COM

DATE	REVISION	NO.
9/1/2009	DEVELOP	1
11/7/2009	REVISE	2
11/7/2009	REVISE	3
11/7/2009	REVISE	4
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11/7/2009	REVISE	100



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 www.spurlock.com



DATE: 10/15/10
 DRAWING NO.: 10-100-01
 SHEET NO.: 10-100-01-01
 PROJECT NO.: 10-100-01
 CLIENT: GWINNETT COUNTY BOARD OF EDUCATION
 DESIGNER: JCF

DATE: 10/15/10
 DRAWING NO.: 10-100-01
 SHEET NO.: 10-100-01-01
 PROJECT NO.: 10-100-01
 CLIENT: GWINNETT COUNTY BOARD OF EDUCATION
 DESIGNER: JCF

DATE: 10/15/10
 DRAWING NO.: 10-100-01
 SHEET NO.: 10-100-01-01
 PROJECT NO.: 10-100-01
 CLIENT: GWINNETT COUNTY BOARD OF EDUCATION
 DESIGNER: JCF

DATE: 10/15/10
 DRAWING NO.: 10-100-01
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 PROJECT NO.: 10-100-01
 CLIENT: GWINNETT COUNTY BOARD OF EDUCATION
 DESIGNER: JCF

DATE: 10/15/10
 DRAWING NO.: 10-100-01
 SHEET NO.: 10-100-01-01
 PROJECT NO.: 10-100-01
 CLIENT: GWINNETT COUNTY BOARD OF EDUCATION
 DESIGNER: JCF

DATE: 10/15/10
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 PROJECT NO.: 10-100-01
 CLIENT: GWINNETT COUNTY BOARD OF EDUCATION
 DESIGNER: JCF

DATE: 10/15/10
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 PROJECT NO.: 10-100-01
 CLIENT: GWINNETT COUNTY BOARD OF EDUCATION
 DESIGNER: JCF

DATE: 10/15/10
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 PROJECT NO.: 10-100-01
 CLIENT: GWINNETT COUNTY BOARD OF EDUCATION
 DESIGNER: JCF

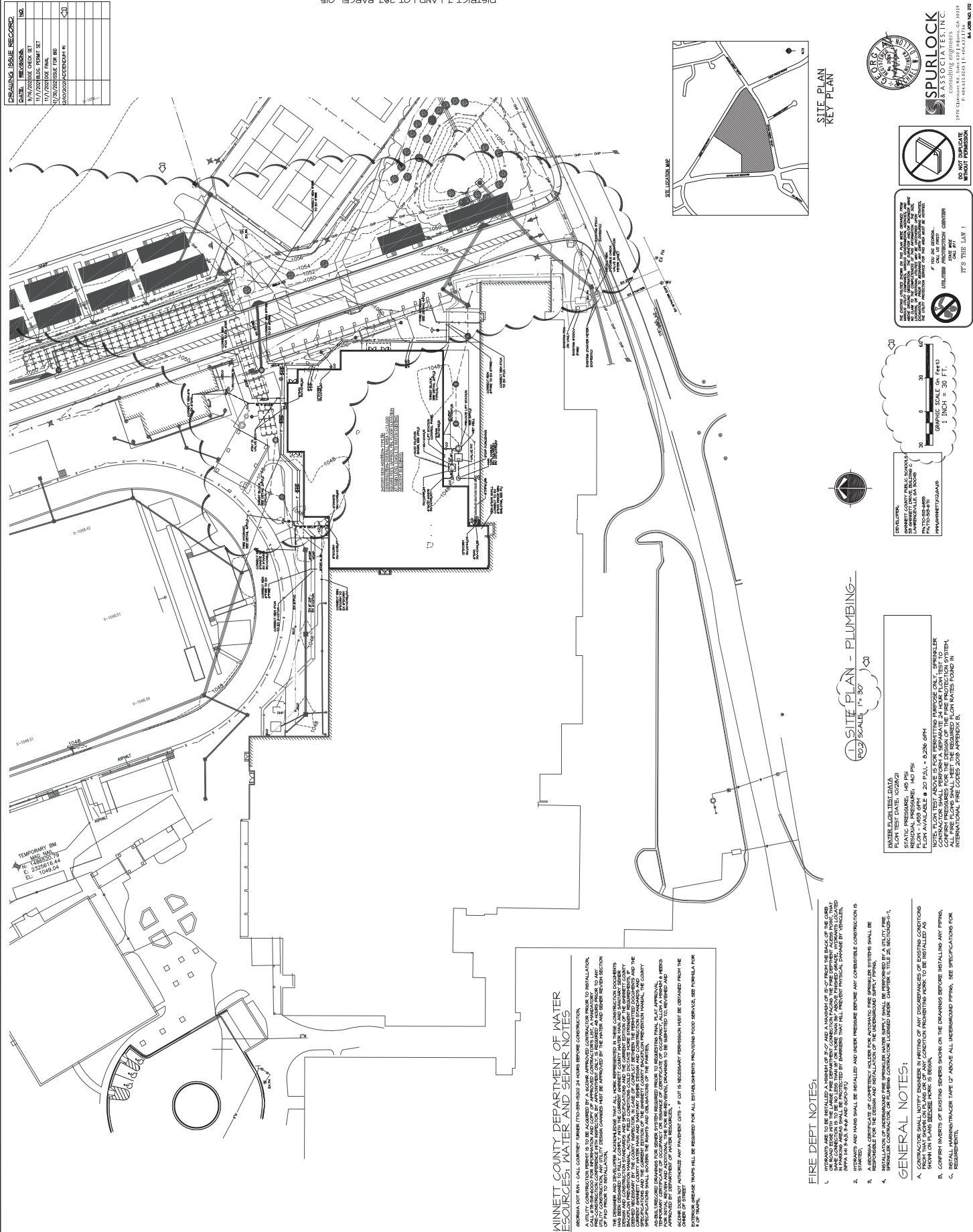
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 DESIGNER: JCF

DATE: 10/15/10
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 SHEET NO.: 10-100-01-01
 PROJECT NO.: 10-100-01
 CLIENT: GWINNETT COUNTY BOARD OF EDUCATION
 DESIGNER: JCF

DATE: 10/15/10
 DRAWING NO.: 10-100-01
 SHEET NO.: 10-100-01-01
 PROJECT NO.: 10-100-01
 CLIENT: GWINNETT COUNTY BOARD OF EDUCATION
 DESIGNER: JCF

DATE: 10/15/10
 DRAWING NO.: 10-100-01
 SHEET NO.: 10-100-01-01
 PROJECT NO.: 10-100-01
 CLIENT: GWINNETT COUNTY BOARD OF EDUCATION
 DESIGNER: JCF

DATE: 10/15/10
 DRAWING NO.: 10-100-01
 SHEET NO.: 10-100-01-01
 PROJECT NO.: 10-100-01
 CLIENT: GWINNETT COUNTY BOARD OF EDUCATION
 DESIGNER: JCF



DISTRICT 7, LAND LOT 201, PARCEL 015
 FACILITY CODE 667-4596

TEMPORARY BM
 MEAS. BY: [unclear]
 DATE: 10/15/10
 ELEVATION: 1049.08

FIRE DEPT. NOTES:

1. INSTANT ARE TO BE INSTALLED A MINIMUM OF 3'-0" AND A MAXIMUM OF 3'-6" FROM THE BACK OF THE CURB. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING AND PROPOSED PIPING AND PROVIDE A SEPARATE 24 HOUR PLAN SET TO THE FIRE DEPARTMENT. ALL PIPING SHALL MEET THE REQUIRED FLAMMABLE LIQUID (FLL) RATES FOUND IN INTERNATIONAL FIRE CODES AND APPLICABLE TO THE PROJECT.
2. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING AND PROPOSED PIPING AND PROVIDE A SEPARATE 24 HOUR PLAN SET TO THE FIRE DEPARTMENT. ALL PIPING SHALL MEET THE REQUIRED FLAMMABLE LIQUID (FLL) RATES FOUND IN INTERNATIONAL FIRE CODES AND APPLICABLE TO THE PROJECT.
3. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING AND PROPOSED PIPING AND PROVIDE A SEPARATE 24 HOUR PLAN SET TO THE FIRE DEPARTMENT. ALL PIPING SHALL MEET THE REQUIRED FLAMMABLE LIQUID (FLL) RATES FOUND IN INTERNATIONAL FIRE CODES AND APPLICABLE TO THE PROJECT.
4. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING AND PROPOSED PIPING AND PROVIDE A SEPARATE 24 HOUR PLAN SET TO THE FIRE DEPARTMENT. ALL PIPING SHALL MEET THE REQUIRED FLAMMABLE LIQUID (FLL) RATES FOUND IN INTERNATIONAL FIRE CODES AND APPLICABLE TO THE PROJECT.

GENERAL NOTES:

- A. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING AND PROPOSED PIPING AND PROVIDE A SEPARATE 24 HOUR PLAN SET TO THE FIRE DEPARTMENT. ALL PIPING SHALL MEET THE REQUIRED FLAMMABLE LIQUID (FLL) RATES FOUND IN INTERNATIONAL FIRE CODES AND APPLICABLE TO THE PROJECT.
- B. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING AND PROPOSED PIPING AND PROVIDE A SEPARATE 24 HOUR PLAN SET TO THE FIRE DEPARTMENT. ALL PIPING SHALL MEET THE REQUIRED FLAMMABLE LIQUID (FLL) RATES FOUND IN INTERNATIONAL FIRE CODES AND APPLICABLE TO THE PROJECT.
- C. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING AND PROPOSED PIPING AND PROVIDE A SEPARATE 24 HOUR PLAN SET TO THE FIRE DEPARTMENT. ALL PIPING SHALL MEET THE REQUIRED FLAMMABLE LIQUID (FLL) RATES FOUND IN INTERNATIONAL FIRE CODES AND APPLICABLE TO THE PROJECT.
- D. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING AND PROPOSED PIPING AND PROVIDE A SEPARATE 24 HOUR PLAN SET TO THE FIRE DEPARTMENT. ALL PIPING SHALL MEET THE REQUIRED FLAMMABLE LIQUID (FLL) RATES FOUND IN INTERNATIONAL FIRE CODES AND APPLICABLE TO THE PROJECT.

GWINNETT COUNTY DEPARTMENT OF WATER RESOURCES: WATER AND SEWER NOTES

1. GEORGIA DOT RW - CALL COURTESY ENGINEER (770-381-1001) 24 HOURS BEFORE CONSTRUCTION.
2. ALL THE CONSTRUCTION SHALL BE ACCORDING TO APPROVED CONSTRUCTION DETAILS PROVIDED BY INSTALLATION CONTRACTOR. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING AND PROPOSED PIPING AND PROVIDE A SEPARATE 24 HOUR PLAN SET TO THE FIRE DEPARTMENT. ALL PIPING SHALL MEET THE REQUIRED FLAMMABLE LIQUID (FLL) RATES FOUND IN INTERNATIONAL FIRE CODES AND APPLICABLE TO THE PROJECT.
3. THE DESIGNER AND ENGINEER ACKNOWLEDGE THAT ALL WORK SHOWN ON THESE CONSTRUCTION DOCUMENTS HAS BEEN PROVIDED TO ALL CONTRACTORS AND ALL CONTRACTORS SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION OF ALL EXISTING AND PROPOSED PIPING AND PROVIDE A SEPARATE 24 HOUR PLAN SET TO THE FIRE DEPARTMENT. ALL PIPING SHALL MEET THE REQUIRED FLAMMABLE LIQUID (FLL) RATES FOUND IN INTERNATIONAL FIRE CODES AND APPLICABLE TO THE PROJECT.
4. AS-BUILT/RECORD DRAWINGS FOR SEWER SYSTEM REQUIRED PRIOR TO REQUESTING FINAL PLAN APPROVAL. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING AND PROPOSED PIPING AND PROVIDE A SEPARATE 24 HOUR PLAN SET TO THE FIRE DEPARTMENT. ALL PIPING SHALL MEET THE REQUIRED FLAMMABLE LIQUID (FLL) RATES FOUND IN INTERNATIONAL FIRE CODES AND APPLICABLE TO THE PROJECT.
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6. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING AND PROPOSED PIPING AND PROVIDE A SEPARATE 24 HOUR PLAN SET TO THE FIRE DEPARTMENT. ALL PIPING SHALL MEET THE REQUIRED FLAMMABLE LIQUID (FLL) RATES FOUND IN INTERNATIONAL FIRE CODES AND APPLICABLE TO THE PROJECT.

cunningham fedward mathews mae

DATE: MARCH 1, 2021
 TIME: 9:52 AM
 PROJECT: EAST ADDITION
 NORTH GUINNETT HIGH SCHOOL
 20 LEVEL CREEK ROAD, SUWANEE, GA 30024
 GUINNETT COUNTY BOARD OF EDUCATION
 GUINNETT COUNTY, GEORGIA

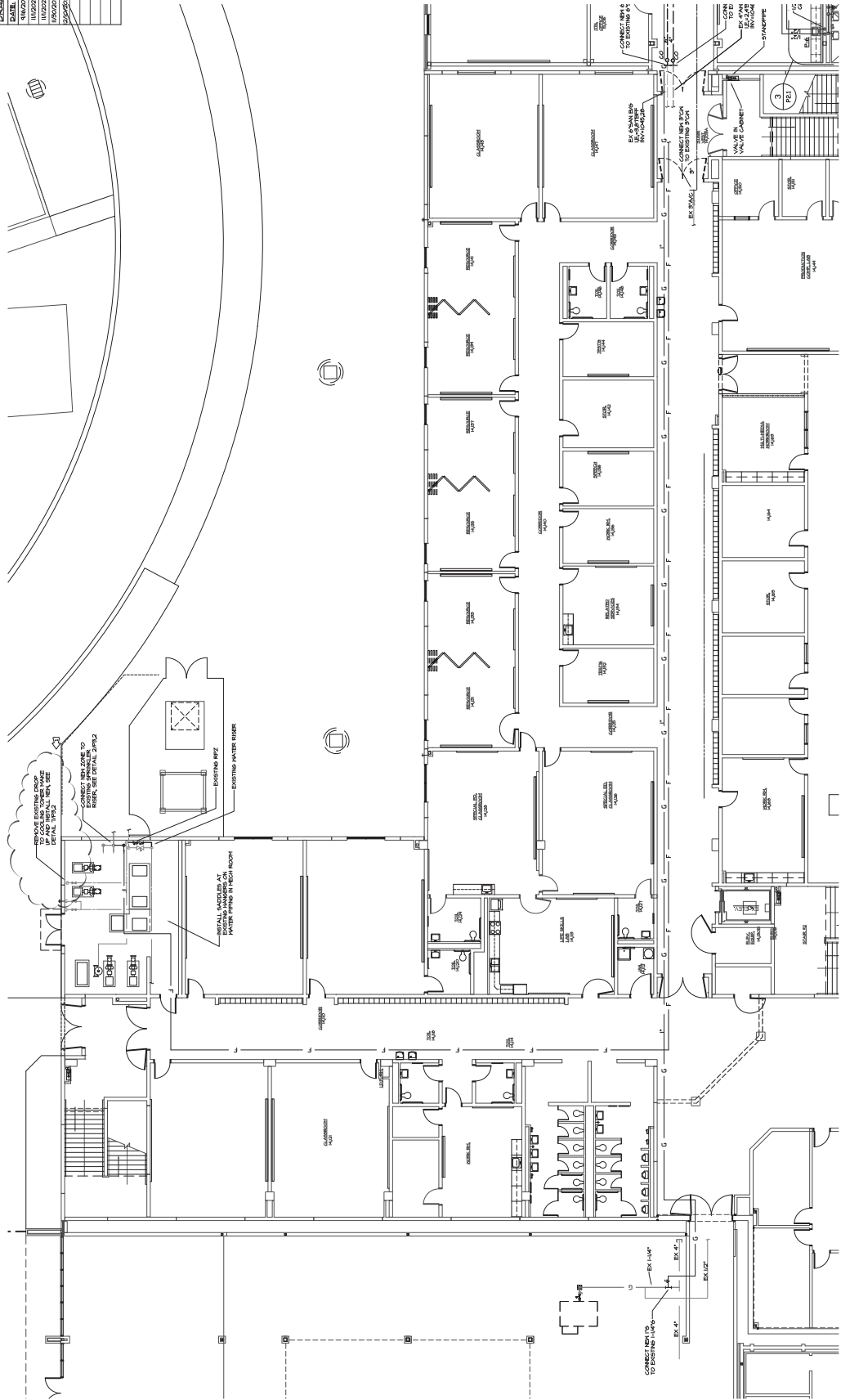
cunningham fedward mathews & moore, architects, inc. - 2011 manchester street, n.e. - atlanta, georgia 30324 - phone (404) 873-2152

P1.4

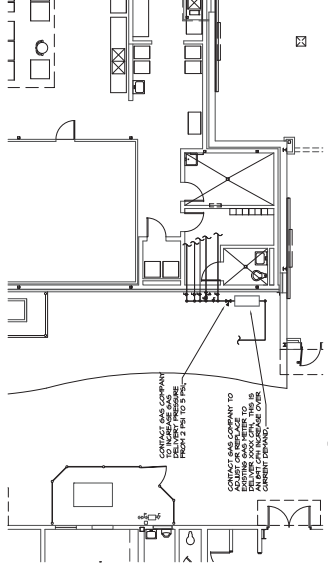
DRAWING ISSUE RECORD

NO.	DATE	REVISIONS
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2	03/01/21	ISSUE FOR SET
3	03/01/21	ISSUE FOR SET
4	03/01/21	ISSUE FOR SET
5	03/01/21	ISSUE FOR SET

FACILITY CODE 66T-45B6



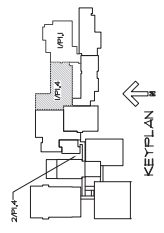
(1) FIRST FLOOR PARTIAL PLAN - PLUMBING
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(2) FIRST FLOOR PARTIAL PLAN - PLUMBING
 (SCALE: 1/8"=1'-0")



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 Consulting Engineers, Architects
 3195 Dink Springs Drive, Suite 100
 Marietta, Georgia 30066
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 Fax: (770) 421-1314
 Website: www.spurllock.com



SEE SHEET P1.2 FOR PLUMBING NOTES

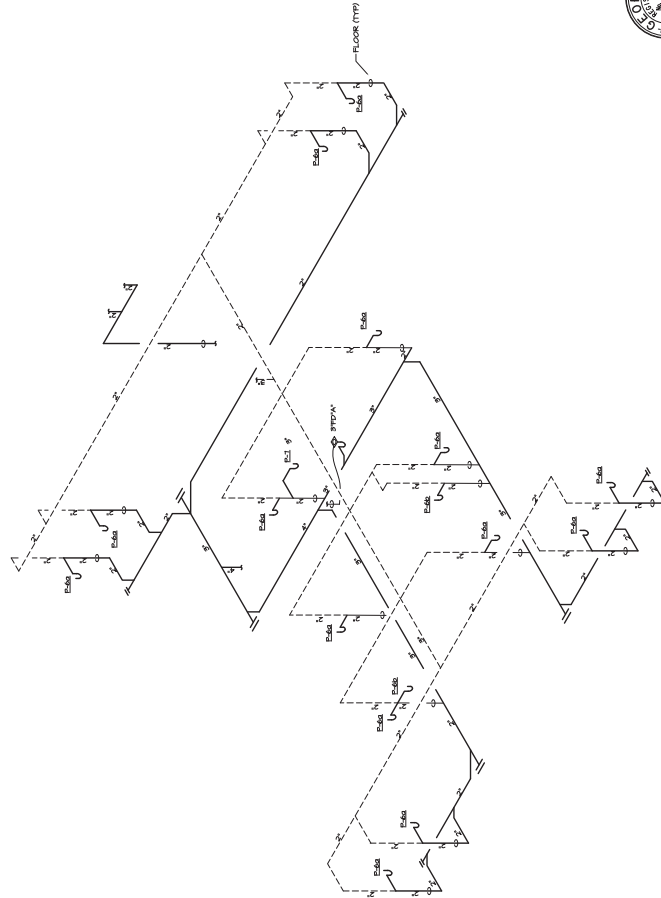
Cunningham Federal Mathews Moore

Cunningham, Forehand, Mathews & Moore, Architects, Inc. - 2011 Manchester Street, N.E. - Atlanta, Georgia 30324 - Phone (404) 873-2152
 20 LEVEL CREEK ROAD, SUWANEE, GA 30024
 EAST ADDITION
 GUINNETT COUNTY BOARD OF EDUCATION
 GUINNETT COUNTY, GEORGIA

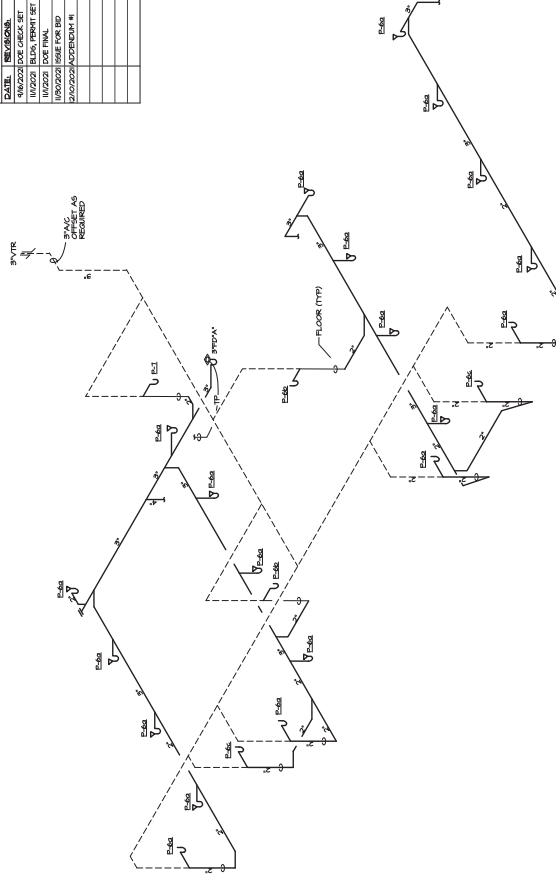
SPURLOCK & ASSOCIATES, INC.
 Consulting Engineers, P.C.
 1155 DIXIE HWY. N.E.
 SUWANEE, GA 30024
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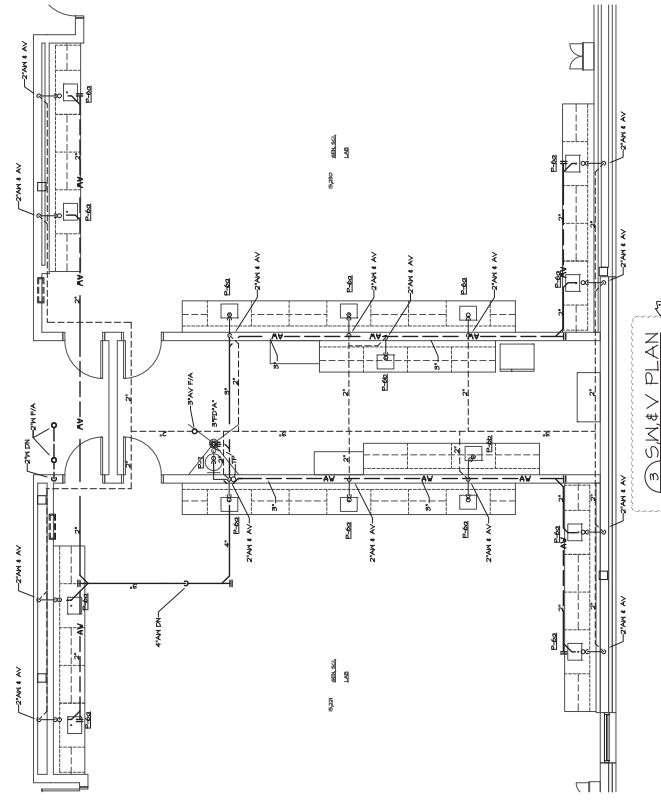
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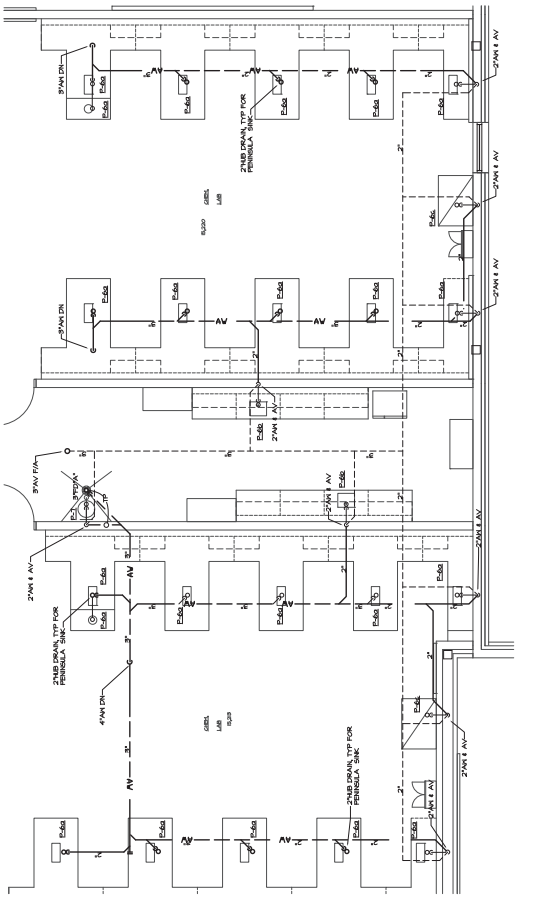
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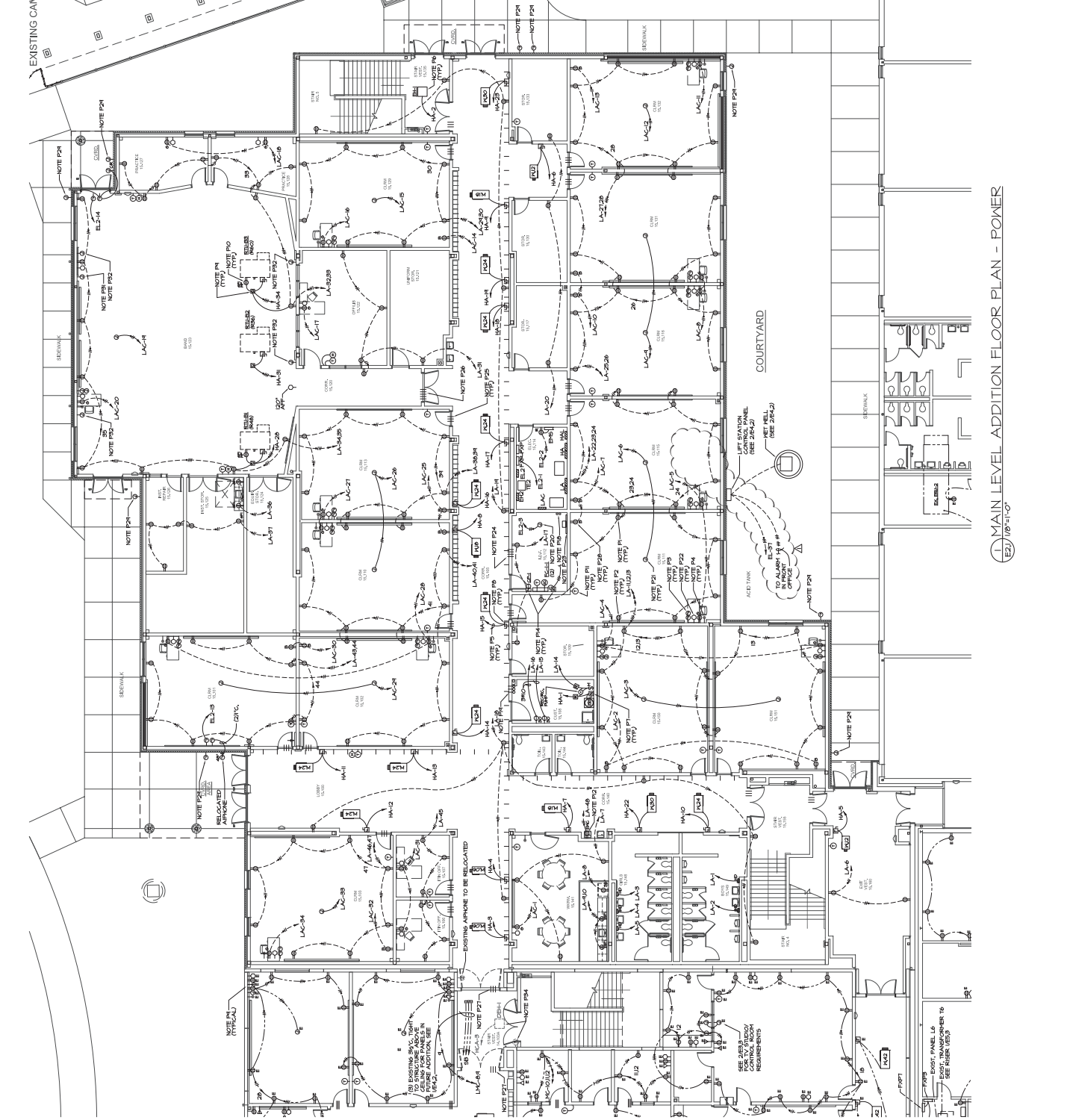


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	ISSUE FOR RECORD	

FACILITY CODE 66T-45B6

NORTH GUINNETT HIGH SCHOOL
 EAST ADDITION
 20 LEVEL CREEK ROAD, SUWANEE, GA 30024
 GUINNETT COUNTY BOARD OF EDUCATION
 GUINNETT COUNTY, GEORGIA
 DATE: 08/14/12
 DESIGNED BY: GJK
 CHECKED BY: GJK

- REFERENCED POWER NOTES:** (APPLIES TO SHEETS E2.1 THRU E2.4)
- P1. DO NOT INSTALL ANY OUTLETS BACK TO BACK.
 - P2. SEE MECHANICAL DRAWINGS FOR THE LOCATION OF THE MAIN ELECTRICAL PANEL.
 - P3. SEE DETAIL A24 FOR THE LOCATION OF THE MAIN ELECTRICAL PANEL.
 - P4. SEE DETAIL A24 FOR THE LOCATION OF THE MAIN ELECTRICAL PANEL.
 - P5. ALL CONDUIT IN CORRIDORS SHALL BE ABOVE HFP UNITS AND OUT OF INT ACCESS PANELS.
 - P6. CONDUIT TO BE IN DISCONNECT IN UNIT.
 - P7. SEE MECHANICAL EQUIPMENT LEGEND ON SHEET E2.4 FOR SWITCH AND CONDUCTOR SIZES.
 - P8. MECHANICAL EQUIPMENT SHALL BE LOCATED AS CLOSE TO INT CONNECTION LOCATION AS POSSIBLE BUT OUT OF INT ACCESS SPACE. SWITCHES SHALL HAVE LOCATIONS AS SHOWN ON THIS DRAWING FOR THE LOCATION OF THE MAIN ELECTRICAL PANEL.
 - P9. COORDINATE WITH OTHER TRADES. SEE MECHANICAL EQUIPMENT LEGEND ON SHEET E2.4 FOR THE LOCATION OF THE MAIN ELECTRICAL PANEL.
 - P10. FOR ROOM MOUNTED EQUIPMENT - RUN RIGID STEEL CONDUIT UP THROUGH FLOOR GIRDERS. INSTALL ALL WITH THE RIGID STEEL CONDUIT THROUGH THE FLOOR GIRDERS. CONDUIT SHALL BE INSTALLED IN THE FLOOR GIRDERS WITH THE RIGID STEEL CONDUIT. CONDUIT SHALL BE INSTALLED IN THE FLOOR GIRDERS WITH THE RIGID STEEL CONDUIT.
 - P11. CONDUIT TO BE INSTALLED IN THE FLOOR GIRDERS WITH THE RIGID STEEL CONDUIT.
 - P12. COORDINATE EXACT LOCATION OF THE SWITCHES AND DISCONNECTS WITH MECHANICAL.
 - P13. UNIT OR EQUIPMENT SHALL BE INSTALLED IN THE FLOOR GIRDERS WITH THE RIGID STEEL CONDUIT.
 - P14. BRUSH AND NYLON BRUSHED COVER PLATE FOR SWITCH AND CONDUCTOR.
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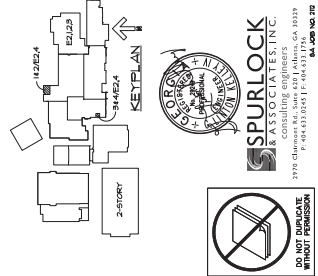
E2.1 MAIN LEVEL ADDITION FLOOR PLAN - POWER

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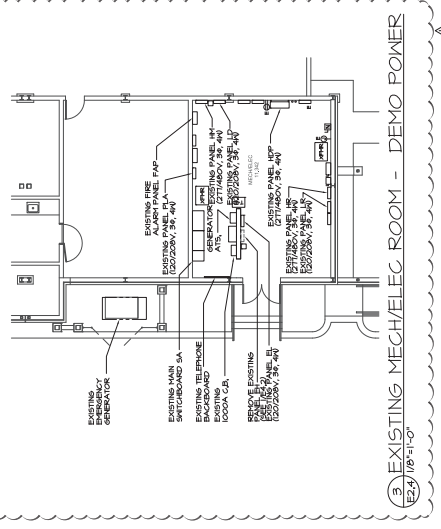
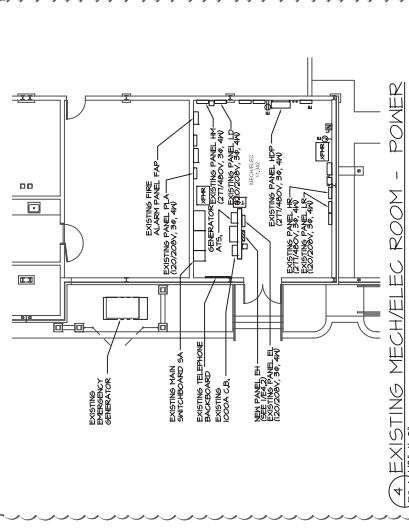
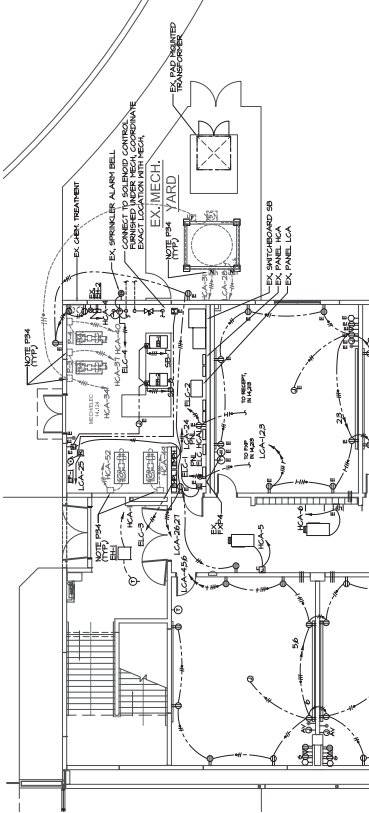
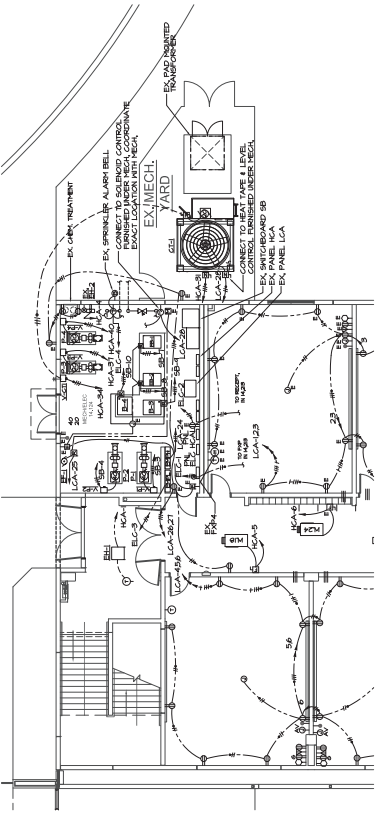
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	ISSUE CONTRACT SET	
	ISSUE FOR PERMITS	
	ISSUE FOR BIDDING	
	ISSUE AS BIDDING	
	ISSUE FOR CONSTRUCTION	



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SEE SHEET E2.1 FOR REFERENCED POWER NOTES.



PROJECT MANUAL

FOR

CONSTRUCTION

OF

NORTH GWINNETT HIGH SCHOOL

EAST ADDITION

20 LEVEL CREEK ROAD NW

SUWANEE, GA 30024

FOR

GWINNETT COUNTY BOARD OF EDUCATION

GWINNETT COUNTY, GEORGIA

Date of Project Manual: March 1, 2021

CUNNINGHAM FOREHAND MATTHEWS & MOORE, ARCHITECTS, INC.
2011 MANCHESTER STREET, N. E.
ATLANTA, GEORGIA 30324
(404) 873-2152

Architect's Project No. SHL-D01-21

DO NOT BREAK THESE DOCUMENTS INTO PARTS AND SUB-PARTS. THE GWINNETT COUNTY BOARD OF EDUCATION ASSUMES NO RESPONSIBILITY FOR THE SEPARATION OF THESE DOCUMENTS BY ANY ENTITY OF THE CONTRACTING INDUSTRY. EACH CONTRACTING ENTITY SHALL BE RESPONSIBLE FOR ALL THE WORK RELATED TO THEIR TRADES WHEREVER IT MAY BE SHOWN WITHIN THE CONTRACT DOCUMENTS PACKAGES.

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SECTION 271619 - COMMUNICATIONS PATCH CORDS

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END OF SECTION TC

SECTION BDA - ADVERTISEMENT FOR BIDSCONSTRUCTION OF EAST ADDITION TO NORTH GWINNETT HIGH SCHOOL FOR GWINNETT COUNTY BOARD OF EDUCATION, GWINNETT COUNTY, GEORGIA.

This project consists of grading, storm drainage, curb and gutter, asphalt paving, concrete walks, steel frame structure, cmu walls, concrete slabs on grade and elevated, single ply roofing, hollow metal doors and frames, finish hardware, aluminum storefront and glazing, drywall and framing, carpet, vct, porcelain and ceramic tile, acoustical ceilings, painting, casework, toilet partitions, tack and marker boards, plumbing, fire protection, hvac, controls and electrical.

Sealed lump sum proposals from Contractors previously approved through the Owner's pre-qualification process for this project, will be received by the Gwinnett County Board of Education, Conference Room, Building "C", 53 Gwinnett Drive, Lawrenceville, Georgia 30046 until **3:00 p.m.**, local time, on **January 6, 2022** at which time and place all proposals received will be opened and read aloud. Proposals received after the above time is called will be returned. No phones will be available. Gwinnett County Public Schools' fax machines and computers shall not be used to receive faxes or e-mails for bidders.

Contract, if awarded, will be on a stipulated sum basis. Bids may not be withdrawn for a period of sixty (60) days after the date of receipt of bids. Bids shall be accompanied by a bid bond payable to Gwinnett County Board of Education in an amount equal to five percent of the base bid (Certified Checks NOT Acceptable). Performance Bond and Labor and Material Payment Bond, each amount equal to 100 percent of the contract sum, will be required of the successful bidder. These bonds shall be executed by a Surety Company licensed to do business in the State of Georgia, be listed on "Department of The Treasury Circular 570" and have an A.M. Best Company rating of at least Class "A", with a Financial Size of VI or better. Bonds must be accompanied by letter stating company's current rating for verification prior to acceptance by the Owner and execution of the formal Owner/Contractor agreement.

Subcontractor Bonds:

The following Subcontractors will be required to furnish Performance and Payment Bond and Labor and Material Payment Bond, each equal to 100% of their respective subcontracts:

Roofing, Plumbing, Mechanical (HVAC), Fire Protection and Electrical Subcontractors.

Performance, Labor and Material Payment Bonds shall be the same as required by the General Contractor.

The Owner will make progress payments to the successful contractor upon receipt of request for payment having been certified by the Architect as fully covered and shown in Contract Documents.

Contract documents may be examined at the office of the Chief Operations Officer for Facilities and Operations, 53 Gwinnett Drive, Lawrenceville, GA; in the office of the Architect; AGC Builders

Exchange, Atlanta, GA; Reed Construction Data, Norcross, GA; Gainesville Whiteprint, Gainesville, GA; LDI Reproductions, Lawrenceville, GA; or CAD Media, Inc., Lawrenceville, GA.

All Pre-Qualified Bidders must obtain plans through the Architect, Cunningham Forehand Matthews & Moore, Architects, Inc., 2011 Manchester Street, NE, Atlanta, GA 30324, telephone (404) 873-2152. Interested General Contractors must submit Bid Deposit prior to being issued plans and specifications. Applications for documents, together with a non-refundable Bid deposit of \$ 300.00 per hard copy set, and/or **\$50.00 for Access to Electronic PDF versions** of Specifications and Drawings via FTP site will be given following receipt of deposit. **Plans and specifications will be released only to Contractors who have been Pre-Qualified by the Owner.** Obtain documents by sending an email to jrobinson@cfmm.net and copy switt@cfmm.net. Bid deposits are non-refundable.

PRE-BID CONFERENCE:

A **mandatory** pre-bid conference will be held at the Gwinnett County Board of Education, Conference Room, Building "C", 53 Gwinnett Drive, Lawrenceville, Georgia 30046 at **10:00 a.m.**, local time, on **Monday, December 20, 2021**. Representative shall be Project Manager or Estimator directly responsible for the bidding of this project. Any bidder may be required, at the discretion of the Owner, to furnish evidence, satisfactory to the Owner, that his proposed subcontractors have sufficient means and experience in the types of work called for to assure completion of the contract in a satisfactory manner.

All Pre-Qualified Bidders for this project shall attend the Pre-Bid Conference. FAILURE TO ATTEND SHALL RESULT IN DISQUALIFICATION OF THE BIDDER.

The Owner reserves the right to reject any and all bids, to waive any informalities in bidding, and to award a contract for any part of the work, or the job as a whole.

End of Section BDA

SECTION BDI - INSTRUCTIONS TO BIDDERS

All contact with the Owner up to and including the Bidding Phase shall be made to and through:

John Gramigna, Director of Facility Planning
(or his designated representative)
Gwinnett County Board of Education
53 Gwinnett Drive, Building C
Lawrenceville, Georgia 30046
Telephone: 770 - 513-6621

Costs for temporary water, gas, telephone, power services and Permit Inspection Fees will be paid for by the Contractor. The Owner will pay for utility costs starting on the date of Substantial Completion.

PUBLIC UTILITIES FIRE HYDRANT USAGE:

Due to the fact that the Gwinnett County Department of Public Utilities will charge \$75.00 per day to meter water usage at a fire hydrant location, each bidder needs to understand that the bidders cost to the general contractor needs to include an allowance to cover county metering. The Pest Control Company is responsible for the estimated time to complete any given project.

DEFINITIONS:

All definitions set forth in the General Conditions of the Contract for Construction, GCPS-General Conditions, Revision VII, dated: 07/15/11, are applicable to these Instructions to Bidders.

Bidding Documents include the Bid Advertisement, Instructions to Bidders and the Contract Documents, including any addenda issued prior to receipt of bids.

Addenda are written or graphic instruments issued prior to the execution of the Contract which modify or interpret the bidding documents, including Drawings and Specifications, by additions, deletions, clarifications or corrections. Addenda will become part of the Contract Documents when the Construction Contract is executed.

PRE-BID CONFERENCE:

A mandatory pre-bid conference will be held at the Gwinnett County Board of Education, Conference Room, Building "C", 53 Gwinnett Drive, Lawrenceville, Georgia 30046 at 10:00 a.m., local time, on Monday, December 20, 2021.

All Pre-Qualified Bidders shall attend the Pre-Bid Conference. FAILURE TO ATTEND SHALL RESULT IN DISQUALIFICATION OF THE BIDDER.

Any Bidder that is disqualified may respond to the Owner in writing within 20 days of the Notice of Disqualification as to why the Bidder feels the disqualification is unfounded. The written appeal from the disqualified Bidder will not change the decision already made on this project. However, a favorable appeal may open the way for the Bidder in question to bid on future Gwinnett County Public School System projects.

No new Bidders will be added following the Pre-Bid Conference.

BIDDER'S REPRESENTATION:

Each Bidder represents that his bid is based upon the materials and equipment described in the contract documents.

Each bidder by making his bid represents that he has read and understands the bidding documents.

Each bidder by making his bid represents that he has visited the site and familiarized himself with the local conditions under which the Work is to be performed.

BIDDING PROCEDURES:

All bids must be prepared on the forms provided by the Architect and submitted in accordance with the Instructions to Bidders.

A bid is invalid if it has not been deposited at the designated location prior to the time and date for receipt of bids indicated in the advertisement or invitation to bid, or prior to any extension thereof issued to the bidders.

Unless otherwise provided in any supplement to these Instructions to Bidders, no bidder shall modify, withdraw or cancel his bid or any part thereof for sixty (60) days after the time designated for the receipt of bids in the Invitation to Bid.

Seven (7) days prior to the receipt of bids, Addenda will be mailed from the Architect's office to each person or firm recorded by the Architect as having received the bidding documents and will be available for inspection wherever the bidding documents are kept available for that purpose. Addenda issued after receipt of bids will be mailed or delivered only to the selected bidders.

SUBSTITUTIONS FOR SPECIFIED MATERIALS OR EQUIPMENT:

When references are made in the specifications to trade names, or to the names of manufacturers, such references are made solely to designate and identify the quality of the equipment or material to be furnished, and are not intended to restrict competitive bidding. In case the Contractor wishes to use material and equipment other than those specified, PRIOR WRITTEN APPROVAL of the Architect must be obtained. If it is desired to use equipment or materials of different manufacture or trade names from those specified, application for approval of such equipment or materials must reach the hands of the Architect at least ten (10) days prior to the date set for the opening of bids. Application for approval must be accompanied by supporting data clearly proving equality of the proposed substitute to that specified. To be acceptable, a substitute must be equal, or exceed, all requirements of the base specifications, including space limitations. A comparative data schedule shall accompany the submittal. Any changes in the work which might be required to accommodate the proposed substitute shall be clearly shown and described. Should the proposed substitute be approved, any such changes required in other work due to the use of the substitute shall be coordinated and accomplished by the Contractor as part of the Contract at no additional cost to the Owner.

Approval of substitutes will be made by written addendum, issued to all prospective bidders, and mailed from the Architect's office seven (7) days prior to the date set for the opening of bids.

No consideration can be given to requests for approval received later than ten (10) days prior to the date set for opening of bids.

Failure of a proposed product substitution to appear in a written addendum shall mean that the Architect has NOT APPROVED that substitution and that specific substitution may not be incorporated into the project.

EXAMINATION OF BIDDING DOCUMENTS:

Each bidder shall examine the bidding documents carefully and, not later than ten (10) days prior to the date for receipt of bids, shall make written request to the Architect for interpretation or correction of any ambiguity, inconsistency, or error therein which he may discover. Any interpretation or correction will be issued as an Addendum by the Architect. Only a written interpretation or correction by Addendum shall be binding. No bidder shall rely upon any interpretation or correction given by any other method.

REJECTION OF BIDS:

The bidder acknowledges the right of the Owner to reject any or all bids and to waive any informality or irregularity in any bid received. In addition, the bidder recognizes the right of the Owner to reject a bid if the bidder failed to furnish any required bid security, or to submit the data required by the bidding documents, or if the bid is in any way incomplete or irregular.

OWNER / CONTRACTOR AGREEMENT:

Construction contracts between Owner and Contractor shall be The Gwinnett County Board of Education "Standard Form of Agreement Between Owner and Contractor, Revision VIII, 1/23/15, where the basis of payment is a Stipulated Sum." Agreements shall be signed by an officer of the company and shall be stamped and crimped with the General Contractor's company seal.

The **ATTACHMENT EXHIBIT "A" TO STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR** shall be attached to the Contract in its entirety.

Construction Contracts shall include The Gwinnett County Board of Education General Conditions: "GCPS-General Conditions, Revision VIII, 08/30/13".

PERFORMANCE AND PAYMENT BOND:

A Performance Bond and Payment Bond, each in the amount of 100% of the Contract Sum, will be required of successful bidder, unless otherwise directed by the Owner. The surety must be one which is authorized to do business in the State of Georgia and is listed on "Department of the Treasury Circular 570." In addition, company furnishing bonds shall have an A.M. Best company rating of at least a Class "A" with a financial size of VI or better. Bonds must be accompanied by letter stating company's current rating for verification prior to acceptance by the Owner and execution of the formal Owner/Contractor Agreement.

Subcontractor Bonds:

The following Subcontractors will be required to furnish Performance and Payment Bond and Labor and Material Payment Bond, each equal to 100% of their respective subcontracts:

Roofing, Plumbing, Mechanical (HVAC), Sprinkler and Electrical Subcontractors.

Performance and Payment Bonds shall be the same as required of the General Contractor.

PROPOSALS:

All bids shall be submitted in **duplicate** on the forms provided by the Architect and shall be enclosed in a sealed envelope bearing the firm name of the bidder and clearly labeled as follows: Bid bonds, and affidavits required at bid time shall also be submitted in duplicate.

All Bidders shall legibly indicate their State of Georgia, General Contractor's License Number on the Bid proposal envelope.

Bid on Addition and Renovations to Grayson High School, East Addition to North Gwinnett High School

Where Bidder is a corporation, Proposals shall be signed with the legal name of the corporation, the legal signature of an officer authorized to bind the corporation to a contract, and the corporate seal.

All Proposals must be accompanied by a Bid Bond (Certified Checks Not Acceptable) from a qualified surety company as stated under paragraph CONTRACT. Bid Bond shall be drawn in favor of Gwinnett County Board of Education, in an amount not less than five percent (5%) of the BASE BID. The attorney-in-fact who signs the Bid Bond must attach to such Bond a certified copy of his Power of Attorney to sign such Bond, such certificate must include the date of the Bond.

General Contractors may amend the Proposal on bid day by indicating an additive or deductive cost on the outside of the sealed envelope. Changes to the required list of Sub-contractors may also be indicated on the outside of the sealed envelope. No changes will be allowed once time is called and the opening of bids has commenced.

The successful bidder will be required to contract with those Sub-contractors listed on the Proposal Form unless there are objections, in writing, from the Owner or Sub-contractor. The Sub-contractor may withdraw, in writing, due to circumstances such as financial error or being unable to meet certain requirements of the contract documents.

COMPLETION TIME:

All work shall be complete as stated in the Proposal, Section BDP, see also Section 010200 - Phasing.

CHAIN OF COMMAND AND FIELD ORDERS:

ALL contact with the Owner up to and including bidding phase, shall be made to and through:

John Gramigna, Manager of Facility Planning
(or his designated representative)
Gwinnett County Board of Education
53 Gwinnett Drive, Building C
Lawrenceville, Georgia 30046
Telephone: 770-513-6855

All contact with the Owner from contract signing through construction phase shall be made to and through:

Marty Hollis, Director of Construction
(or his designated representative)
Gwinnett County Board of Education
53 Gwinnett Drive, Building C
Lawrenceville, Georgia 30046
Telephone: 770-513-6600

The only other directions the contractor may respond to and the Owner shall be responsible for are those issued by the Executive Director of Facility Planning and Construction, or his designated representative, the Chief Operations Officer of the Department of Facilities and Operations, and the Superintendent for Gwinnett County Public Schools.

It shall be expressly stated and understood that the Owner's Construction Coordinators are not "inspectors"! Their responsibility is to observe, and to work with the Architect and the Contractor in the coordination of all Owner furnished items and any work by Owner's personnel, coordination of construction which may directly affect existing school functions, review all paperwork and submittals such as pay requests, change orders, Architect's statements and invoices, etc.

Correspondence from the contractors through telefax communications shall not be accepted or received by the Owner. Therefore, written communications are not considered official notice until received at 53 Gwinnett Drive, Building "C", Lawrenceville, Georgia 30046.

PROGRESS AND COORDINATION MEETINGS:

Prior to work starting, a pre-construction conference shall be held including the Owner, Architect, General Contractor's project manager and job superintendent, electrical sub-contractor, plumbing sub-contractor and HVAC sub-contractor. For the pre-construction conference, the contractor shall have the following items submitted to the Owner:

The Critical Path Method Time Scaled (CPM) schedules (4 copies).

Contractor's Projected Cash Flow (related to schedule).

Payment and Performance Bond with Power of Attorney (include bond number from the bonding company stating their A. M. Best rating and size) (1 original, 2 copies).

Performance Bond for major subs with Power of Attorney (include bond number and letter from the bonding company stating their A. M. Best rating and size for each bond) (1 original, 2 copies).

Labor and Material Bond (3 copies)

Certificates of Insurance (1 original and 2 copies).

List of subcontractors with contact person(s) and 24 hours telephone numbers (3 copies).

List of Contractor's Project Manager and Job Superintendent with 24 hour telephone numbers (3 copies).

When requested by the Owner or Architect during the entire construction time of the project, the Contractor and certain subcontractors shall attend progress and coordination meetings held in the Owner's offices in Lawrenceville, Georgia. Persons who shall attend are:

Contractor's Superintendent

Contractor's Project Manager or Principal of the Contractor.

Any Subcontractor requested to attend by Owner or Architect. (All subcontractors currently active at the time of the scheduled meeting or anticipated to be active on site during the 30 days following the scheduled meeting).

Representative of the Owner.

Representative of the Architect.

PAYMENTS:

The Owner will make progress payments to the Contractor as stated in the General Conditions, Article 9, PAYMENTS AND COMPLETION. See Section 010440 - PROCEDURES AND CONTROLS also.

NOTICE OF COMMENCEMENT:

The successful bidder, following the award of a contract and receipt of a notice to proceed, shall file a "Notice of Commencement" as required in O.C.G.A. 44-14-361.5(b) and shall post a copy of notice on the project site.

BIDDER'S AFFIDAVIT:

The General Contractor shall provide, along with Bid Proposal and Bid Bond, the Bidder's Affidavit included at the end of this Section.

GEORGIA SECURITY AND IMMIGRATION COMPLIANCE ACT OF 2006:

All Contractors and Subcontractors working on GCPS projects are required to comply with the Georgia Security and Immigration Compliance Act of 2006, as implemented in the State of Georgia as SB529. All required parties must register in the Employment Eligibility Verification (EEV)/Basic Pilot Program operated by the U.S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security. Sample affidavits are at the end of this section. Additional information may be obtained by contacting the Georgia Department of Labor website.

Immigration and Security Affidavit from General Contractor is required along with Bid Bond and Proposal. All Subcontractors shall provide affidavits within thirty (30) days of Notice to Proceed. Failure of Subcontractors to comply will prevent inclusion on payment requests.

ACCESS TO AND OCCUPANCY OF BUILDING FOR OWNER'S INSTALLATION WORK:

Right of access to, and occupancy of, the building during construction is reserved by the Owner for its agents and contractors, for erecting and installing equipment, or other appliances, fixtures, furniture, or structure not included in the Contract with the Contractor. The Owner hereby relieves the Contractor of all liability from damage or injury to the building or neighboring premises, the public, or workmen of either the Contractor or Owner caused by such work in charge of the Owner, its agents or contractors. Occupancy of the building by the Owner, its agents or contractors, for the purpose of said work, shall not in any way signify the acceptance of the building work being done under this Contract in whole or in part.

WORK AT EXISTING CAMPUSES:

In all remodeling, renovating or additions to existing school buildings, particular attention shall be paid so that all work shall be so scheduled to minimize interruptions in the normal school activities. During periods of student testing on Department of Education Standardized Tests, Contractor shall comply with noise restrictions and curtail activities. GCPS will advise the contractor of the scheduled dates and times affecting this Project at Pre-Construction.

Owner shall be notified of all proposed mechanical, electrical or plumbing outages a minimum of 48 hours prior to the occurrence for any outage not to exceed one hour. All electrical outages and all other utility outages of longer duration shall only be scheduled after normal school hours, on weekends, or during school holidays.

In all cases a construction fence shall be constructed to enclose the work area, storage areas, Contractor and his employee parking.

The Owner reserves the option to retain any removed materials and equipment he selects. The Contractor shall disconnect, remove and deliver items selected to the Board of Education Central Warehouse at 610 West Crogan Street, Lawrenceville, Georgia. The Contractor shall remove and dispose of all other material.

All workmen shall be fully clothed and shall be expected to exhibit acceptable behavior. The use of tobacco, alcohol and drug products is prohibited on all Gwinnett County Public School properties. Association with any student or teacher on campus shall be prohibited. Firearms are not allowed on GCPS property, not even in locked vehicles. Contractor's personnel are not to utilize school restroom, cafeteria or telephone facilities. Failure to comply with these requirements can subject personnel to being banned from the campus.

SECURITY BADGE REQUIREMENTS:

All employees of the Contractor shall be required to wear an identification badge for all work on existing school campuses and occupied schools. These badges will be issued without cost to the Contractor; however, the Contractor will be responsible for returning all badges to the Owner at the completion of the Contract. All badges must be returned.

HAZARDOUS MATERIALS:

Neither the Contractor, nor his material suppliers, nor his Subcontractors shall install or otherwise incorporate any materials containing asbestos, PCB or other hazardous materials within the boundaries of the Project. No soil found on site, or transported to the site from remote locations which is contaminated with material containing asbestos, PCB, Radon, gasoline, fuel oil, diesel fuel or other similar fossil fuels shall be used for fill, backfill or landscape topsoil.

The contractor shall require that each of his subcontractors and material suppliers warrants to Owner and Architect that all materials, products and assemblies incorporated, or submitted for incorporation into this Project, are totally free of asbestos, PCB, or other such hazardous materials.

If the Contractor or his Subcontractors or material suppliers have knowledge that, or believe that an item, component, material or accessory within a product or assembly may contain asbestos, PCB or other such hazardous material, it is the Contractor's sole responsibility to secure a written certification from the manufacturer of any suspected material stating this material is totally free of asbestos, PCB or other hazardous materials. A copy of the written certification shall be submitted to the Owner and Architect.

Owner after completion of project may elect and pay to use services of an independent testing agency to test for asbestos content.

If asbestos materials are found to exist in work performed by the Contractor for this project, the Contractor shall pay for the testing above and shall remove and replace the asbestos containing material at no cost to the Owner.

Removal shall be in accordance with the Asbestos Hazard Emergency Response Act requirements and standards.

BIDDER'S AFFIDAVIT

(This form to be executed in compliance with Official Code of Georgia Annotated Section 36-91-21(e). If the contractor is a partnership, the Affidavit shall be executed by all of the partners and any officer, agent, or other person who may have represented or acted for them in bidding for or procuring the contract. If the contractor is a corporation, all officers, agents, or other persons who may have acted for or represented the corporation in bidding for or procuring the contract shall execute the Affidavit.)

State of Georgia
County of _____

_____, being duly sworn, hereby deposes and says
(Insert Name of Affiant)

that he/she has read, and is familiar with, the provisions of Official Code of Georgia Annotated Section 36-91-21(d) which provide as follows:

- (d) Whenever a public works construction contract for any governmental entity subject to the requirements of this chapter is to be let out by competitive sealed bid or proposal, no person, by himself or herself or otherwise, shall prevent or attempt to prevent competition in such bidding or proposals by any means whatever. No person who desires to procure such work for himself or herself or for another shall prevent or endeavor to prevent anyone from making a bid or proposal therefor by any means whatever, nor shall such person so desiring the work cause or induce another to withdraw a bid or proposal for the work.

and that he/she has not directly or indirectly violated said provisions of the law.

Further, Affiant saith not.

This _____ day of _____, 20_____.

Sworn to and subscribed before me this _____ of _____ 20_____.

Notary Public

EXHIBIT "C"



**IMMIGRATION AND SECURITY FORM
(GEORGIA SECURITY AND IMMIGRATION COMPLIANCE ACT AFFIDAVIT)**

Contractor's Name:	
Subcontractor's (Your) Name:	
State Entity's Name:	
State Solicitation/ Contract No.:	

SUBCONTRACTOR AFFIDAVIT

By executing this affidavit, the undersigned Subcontractor verifies its compliance with O.C.G.A. §13-10-91, stating affirmatively that the Subcontractor which is engaged in the physical performance of services under a contract with the Contractor identified above on behalf of the State Entity identified above has registered with and is participating in a federal work authorization program*, in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

EEV /E-Verify™ Company Identification Number

BY: Authorized Officer or Agent
(Subcontractor Name)

Date

Title of Authorized Officer or Agent of Contractor

Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

____ DAY OF _____, 20__

[NOTARY SEAL]

Notary Public

My Commission Expires

*any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603

EXHIBIT "C"



**IMMIGRATION AND SECURITY FORM
(GEORGIA SECURITY AND IMMIGRATION COMPLIANCE ACT AFFIDAVIT)**

Contractor's Name:	
State Entity's Name:	
State Solicitation/ Contract No.:	

CONTRACTOR AFFIDAVIT

By executing this affidavit, the undersigned Contractor verifies its compliance with O.C.G.A. §13-10-91, stating affirmatively that the Contractor identified above has registered with and is participating in a federal work authorization program*, in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

The undersigned further agrees that, should it employ or contract with any subcontractor(s) in connection with the physical performance of services pursuant to this contract with the State Entity, Contractor will secure from such subcontractor(s) similar verification of compliance with O.C.G.A. § 13-10-91 on the attached Subcontractor Affidavit. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the State Entity at the time the subcontractor(s) is retained to perform such service.

EEV /E-Verify™ Company Identification Number

BY: Authorized Officer or Agent
(Contractor Name)

Date

Title of Authorized Officer or Agent of Contractor

Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

____ DAY OF _____, 20__

Notary Public

[NOTARY SEAL]

My Commission Expires

*any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603

SECTION BDP - PROPOSAL

Date: _____

Gwinnett County Board of Education
53 Gwinnett Drive
Lawrenceville, Georgia 30046

Gentlemen:

Having carefully examined the Invitation for Bids; the Instructions to Bidders; the Proposal; the Contract Forms; the General Conditions; the Supplementary Conditions; the Drawings as listed in the INDEX on Cover Sheet (CS), and the Project Manual all entitled:

CONSTRUCTION OF EAST ADDITION TO NORTH GWINNETT HIGH SCHOOL FOR GWINNETT COUNTY BOARD OF EDUCATION, GWINNETT COUNTY, GEORGIA

and dated MARCH 1, 2021, and

Addendum No. / Clarification No.

_____ , dated _____	_____ , dated _____
_____ , dated _____	_____ , dated _____
_____ , dated _____	_____ , dated _____
_____ , dated _____	_____ , dated _____

as well as the site, premises, and conditions affecting the work, the undersigned proposes to furnish all services, labor, and materials necessary to complete the work as described in the above named documents for the sum of:

- A. BASE PROPOSAL: _____
_____ Dollars (\$ _____).
- B. ALLOWANCES: _____
_____ Dollars (\$ _____).
- C. TOTAL BASE BID (A + B = C): _____
_____ Dollars (\$ _____).

which is hereinafter called the BASE BID.

The above Base Bid does not include any plan or building permit fees.

UNIT PRICES/ALLOWANCES:

The following unit prices are amounts to be used for work that will be added to or deleted from the Contract by Change Order in the event such additional work may be required.

Unit prices are complete for labor, equipment, material, the hauling in of needed material and the hauling off and disposal of excess and unsuitable material, installation, acceptable taxes, overhead and profit and all other incidental costs.

OWNER reserves the right to accept or reject these unit prices or require the Work to be performed on a time and material basis with complete daily breakdowns and logs submitted.

DESCRIPTION:

<u>EARTHWORK MATERIALS UNIT PRICE / ALLOWANCE SCHEDULE:</u>	<u>UNIT PRICE</u>	<u>AMOUNT OF ALLOWANCE</u>
---	-------------------	----------------------------

The following quantities shall be included in the Base Bid as Allowances:

- | | | |
|---|-------------------------|----------|
| A. Mass Rock excavation, and disposed of off site (100c.y.): | \$ _____ per cubic yard | \$ _____ |
| B. Trench Rock excavation, and disposed of off site (100 c.y.): | \$ _____ per cubic yard | \$ _____ |
| C. Excavate and haul offsite unsuitable soils (500cy): | \$ _____ per cubic yard | \$ _____ |
| D. Provide suitable soil from offsite and compact in-place to replace excavated rock or unsuitable soil (500 c.y.): | \$ _____ per cubic yard | \$ _____ |

EARTHWORK-RELATED MATERIALS UNIT PRICE SCHEDULE:

The following quantities shall be included in the Base Bid as Allowances:

- | | | |
|---|------------------|----------|
| E. Haul in and placement of #3 stone or #34 stone (100 tons): | \$ _____ per ton | \$ _____ |
| F. Haul in and placement (including compaction) of crushed stone (G.A.B.) (250 tons): | \$ _____ per ton | \$ _____ |

G.	Haul in and placement of #57 stone (250 tons):	\$ _____ per ton	\$ _____
H.	Material and placement of geotechnical fabric (Tensar BX 1100 or equal) (500 s.y.):	\$ _____ per s. y.	\$ _____

MISCELLANEOUS ALLOWANCES:

- A. Contractor shall include in the Base Bid an Allowance of Twenty Thousand Dollars (\$20,000.00) to cover possible asphalt cost escalation that may occur between the project Bid date and the originally scheduled date of installation for binder and for topping.

Contractor shall include in the Base Bid the total quantity and cost of asphalt paving on Bid day. The Asphalt Cement Index as listed by Georgia D.O.T. will be recorded on the Project Bid Date as the basis for the estimated cost of the asphalt on Bid day. Cost escalation applies only to topping and binder raw cost for asphalt types specified, not for base. For purpose of record keeping, Contractor shall separate Bid Date Quantities and costs for base, binder and topping in the initial Schedule of Values.

Compensation for asphalt material cost escalation shall be determined at the time of asphalt installation based on the then current Asphalt Cement Index and the Contract adjusted accordingly up or down.

- B. Contractor shall include in the Base Bid an Allowance of Thirty Thousand Dollars (\$30,000.00) to cover possible requests by the Fire Marshal or Building Inspector for modifications they may require during the course of the work. The Architect and Owner must approve the use of these funds.

The above allowances are to be used at the discretion of the Owner representatives and the Architect and are not intended for use by the Contractor without joint agreement by the Owner representative and the Architect.

Allowances shall be shown in the Schedule of Values as a single line item.

A Schedule of Allowances shall be provided as separate backup.

The above unit prices will also be used to determine any credit due the Owner on any changes in the work.

In submitting this bid it is to be understood that the Owner reserves the right to waive any formality or to reject any and all bids.

NOTE: The General Contractor shall provide the subcontractor information requested below on the Bid Proposal at Bid time. The Subcontractor information requested below is for the confidential use of the Owner and Architect and will not be read at the bid opening. These major Subcontractors are hereby submitted for approval with this Proposal and will be acted upon prior to execution of the Contract. All other principal Subcontractors shall be submitted for approval by the Architect and the Owner within 48 hours following the Award or Notice of Intent to Award a Contract.

	<u>SUBCONTRACT</u>	<u>NAME OF SUBCONTRACTOR</u>
1.	Plumbing	_____
2.	H.V.A.C.	_____
3.	Electrical	_____

For and in consideration of the sum of \$1.00, the receipt of which is hereby acknowledged, the undersigned agrees that this Proposal may not be revoked or withdrawn after the time set for the opening of bids but shall remain open for acceptance for a period of sixty (60) days following such time.

In case he be notified in writing by mail, telegraph, or delivery of the acceptance of this Proposal within sixty (60) days after the time set for the opening of bids, the undersigned agrees to execute a contract (Form of Agreement Between Owner and Contractor, Gwinnett County Board of Education Standard Contract, Revision VIII, dated 09/23/15 for the work for the above stated compensation and to furnish and to deliver to the Owner a Performance and a Payment Bond each in an amount equal to 100% of the Contract Sum and in accordance with the conditions specified under other sections including required subcontractor bonds.

The undersigned agrees to commence actual physical work on the site with an adequate force and equipment as follows:

Commence work within ten (10) days of the Proceed Order and substantially complete all work as stated in Section 010200, PHASING.

Time is the essence of the contract. The complete facility is needed by the Owner no later than stated above; however, an earlier completion date is desirable.

Delays as stated under Article 8.4 of the General Conditions are included in the completion time. Substantial completion is defined in the General Conditions.

Enclosed is a Bid Bond (Certified Checks not acceptable) in the amount of _____ Dollars (\$ _____) (being not less than 5% of the Base Bid, payable to the Owner.

CORPORATE SEAL

Respectfully submitted,

Name: _____

Address: _____

By: _____

Title: _____

The legal name of the Bidder is: _____

State of Georgia General Contractor's License Number _____.

End of Section BDP

GWINNETT COUNTY BOARD OF EDUCATION
437 Old Peachtree Road NW, Suwanee, Georgia 30024



STANDARD FORM OF AGREEMENT BETWEEN
OWNER AND CONTRACTOR

AGREEMENT

made as of this ____ day of _____ in the year of Two Thousand _____.

BETWEEN

The Owner: **GWINNETT COUNTY BOARD OF EDUCATION**
437 Old Peachtree Road
Suwanee, Georgia 30024

and the Contractor: **TBD**
(Name and address)

The Project is: **NORTH GWINNETT HIGH SCHOOL EAST ADDITION**
20 Level Creek Road
Suwanee, GA 30024

The Architect is: **CUNNINGHAM FOREHAND MATTHEWS & MOORE**
ARCHITECTS, INC.
2011 Manchester Street
Atlanta, GA 30024

The Owner and Contractor agree as set forth below.

ARTICLE 1
THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, the current edition of the General Conditions of the Contract, Revision VIII dated August 30, 2013 (General, Supplementary, and other Conditions), Exhibit "A" Attachment, Drawings, Specifications, addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement; these form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

ARTICLE 2
THE WORK OF THIS CONTRACT

The Contractor shall execute the entire Work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others, or as follows:

ARTICLE 3
DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

- 3.1** The date of commencement is the date from which the Contract Time of Paragraph 3.2 is measured, and shall be the date of this Agreement, as first written above, unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

The Date of Commencement will be stipulated by the Notice to Proceed

Unless the date of commencement is established by a notice to proceed issued by the Owner, the Contractor shall notify the Owner in writing not less than five days before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

- 3.2** The Contractor shall achieve Substantial Completion of the entire Work not later than *(Insert the calendar date or number of calendar days after the date of commencement. Also insert any requirements for earlier Substantial Completion of certain portions of the Work, if not stated elsewhere in the Contract Documents.)*

subject to adjustments of this Contract Time as provided in the Contract Documents.

ARTICLE 4
CONTRACT SUM

4.1 The Owner shall pay the Contractor in current funds for the Contractor's performance of the Contract the Contract Sum of _____ Dollars (\$ _____), subject to additions and deductions as provided in the Contract Documents.

4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If decisions on other alternates are to be made by the Owner subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date until which that amount is valid.)

4.3 Unit prices, if any, are as follows:

ARTICLE 5
PROGRESS PAYMENTS

5.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

5.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

Request for payment must be received by the Architect on or before the first day of the month. The architect will approve and send to the Owner's office by the eighth day of the same month in order for the Owner to make payment on the first Friday following the fifteenth of the same month. It shall be understood that if the Contractor's actual progress becomes more than ten percent (10%) behind the Contractor's anticipated progress, the Owner may direct the withholding of payments to the Contractor in an amount equal to the percent behind Contractor's anticipated progress, in addition to the normal 10% withheld.

5.3 Each Application for Payment shall be based upon the schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall

allocate the entire Contract Sum among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

- 5.4 Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.
- 5.5 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:
 - 5.5.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of _____percent (_____ %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Subparagraph 7.3.7 of the General Conditions even though the Contract Sum has not yet been adjusted by the Change Order;
 - 5.5.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of _____percent (_____ %);
 - 5.5.3 Subtract the aggregate of previous payments made by the Owner; and
 - 5.5.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Paragraph 9.5 of the General Conditions.
- 5.6 The progress payment amount determined in accordance with Paragraph 5.5 shall be further modified under the following circumstances:
 - 5.6.1 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, and additional amounts payable in accordance with Subparagraph 9.10.3 of the General Conditions.
- 5.7 Reduction or limitation of retainage, if any, shall be as follows:
(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Subparagraphs 5.5.1 and 5.5.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

As provided by Code Section 13-10-80, as reproduced in Exhibit "A".

ARTICLE 6
FINAL PAYMENT

Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when (1) the Contract has been fully performed by the Contractor except for the Contractor's responsibility to correct nonconforming Work as provided in Subparagraph 12.2.2 of the General Conditions and to satisfy other requirements, if any, which necessarily survive final payment; and (2) a final Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

ARTICLE 7
MISCELLANEOUS PROVISIONS

- 7.1 Where reference is made in this Agreement to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.
- 7.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

(Usury laws and requirements under the Federal Truth in Lending Act, similar state and local consumer credit laws and other regulations at the Owner's and Contractor's principal places of business, the location of the Project and elsewhere may affect the validity of this provision. Legal advice should be obtained with respect to deletions or modifications, and also regarding requirements such as written disclosures or waivers.)

- 7.3 Other provisions:

ARTICLE 8
TERMINATION OR SUSPENSION

- 8.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of the General Conditions.
- 8.2 The Work may be suspended by the Owner as provided in Article 2.3 of the General Conditions.

ARTICLE 9
ENUMERATION OF CONTRACT DOCUMENTS

9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:

9.1.1 The Agreement, Articles 1 thru 9 (pages 1 thru 7). Standard Form of Agreement Between Owner and Contractor.

9.1.2 The General Conditions Articles 1 thru 17, pages 1 thru 41.

9.1.3 The Supplementary and other Conditions of the Contract are those contained in the Project Manual dated _____, and are as follows:

Document	Title	Pages
-----------------	--------------	--------------

9.1.4 The Specifications are those contained in the Project Manual dated as in Subparagraph 9.1.3, and are as follows:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

Section	Title	Pages
----------------	--------------	--------------

9.1.5 The Drawings are as follows, and are dated _____ unless a different date is shown below:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

Number	Title	Date
---------------	--------------	-------------

9.1.6 The addenda, if any, are as follows:

Number	Date	Pages
---------------	-------------	--------------

Portions of addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

9.1.7 Other documents, if any, forming part of the Contract Documents are as follows:
(List here any additional documents which are intended to form part of the Contract Documents. The General Conditions provide that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

This Agreement entered into as of the day and year first written above and is executed in at least three original copies of which one is to be delivered to the Contractor, one to the Architect for use in the administration of the Contract, and the remainder to the Owner.

OWNER

CONTRACTOR

(SEAL)

GWINNETT COUNTY BOARD OF EDUCATION

(Name of Contractor)

By: _____
(Signature)

By: _____
(Signature)

Dr. Calvin J. Watts, Superintendent
(Printed Name and Title)

(Printed Name and Title)



CAUTION: You should sign an original document which has this caution printed in red.

GWINNETT COUNTY BOARD OF EDUCATION
437 Old Peachtree Road NW, Suwanee, Georgia 30024

**ATTACHMENT
EXHIBIT “A”
TO STANDARD FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR**

Section 1. Article 1 of Chapter 10 of Title 13 of the Official Code of Georgia Annotated, relating to general conditions affecting contracts for public works, is amended by adding at the end of said article a new Code section, to be designated as Code Section 13-10-80, to read as follows:

13-10-80

(a) As used in this Code section, the term:

- (1) “Contractor” means a person having a direct contract with the Owner.
- (2) “Lower tier subcontractor” means a person other than a contractor having a direct Contract with a subcontractor.
- (3) “Owner” means the state, any county, municipal corporation, authority, board of education, or other public board, public body, department, agency instrumentality, or political subdivision of the state.
- (4) “Owner's authorized contract representative” means the architect or engineer in charge of the project for the Owner or such other contract representative or Officer as designated in the contract documents as the party representing the Owner's interest regarding administration and oversight of the project.
- (5) “Subcontractor” means a person other than an Owner having a direct contract with the Contractor.

(b) In any contract for the performance of any construction project entered into on or after July 1, 1985, with an Owner, as defined in paragraph (3) of subsection (a) of this Code section. Such contract shall provide for the following:

After work has commenced at the construction site, progress payments to be made on some periodic basis, and at least monthly, based on the value of work completed as may be provided in the contract documents plus the value of materials and equipment suitably stored, insured, and protected at the construction site, and at the Owner's discretion such materials and equipment suitably stored, insured, and protected off site at a location approved by the Owner's authorized Contract representative when allowed by the contract documents, less retainage: and

- (2) (A) Retainage to a maximum of 10 percent of each progress payment; provided, however, that when 50 percent of the contract value including change orders and other additions to the contract value provided for by the contract documents is due and the manner of completion of the contract work and its progress are reasonably satisfactory to the Owner's authorized contract representative, the Owner shall withhold no more retainage. At the discretion of the Owner and with the approval of the contractor, the retainage of each subcontractor may be released separately as the subcontractor completes his work.

(B) If, after discontinuing the retention, the Owner's authorized contract representative determines that the work is unsatisfactory or has fallen behind schedule, retention may be resumed at the previous level. If retention is resumed by an Owner, the contractor and subcontractors shall be entitled to resume withholding retainage accordingly.

(C) At substantial completion of the work or such other standard of completion as may be provided in the contract documents and as the Owner's authorized contract representative determines the work to be reasonably satisfactory, the Owner shall within 30 days after invoice and other appropriate documentation as may be required by the contract documents are provided pay the retainage to the contractor. If at that time there are any remaining incomplete minor items, an amount equal to 200 percent of the value of each item as determined by the

Owner's authorized contract representative shall be withheld until such item or items are completed. The reduced retainage shall be shared by the contractor and subcontractors as their interests may appear.

(D) The contractor shall, within ten days from the contractor's receipt of retainage from the Owner, pass through payments to subcontractors and shall reduce each subcontractor's retainage in the same manner as the contractor's retainage is reduced by the Owner, provided that the value of each subcontractor's work complete and in place equals 50 percent of his subcontract value, including approved change orders and other additions to the subcontract value and provided, further, that the work of the subcontractor is proceeding satisfactorily and the subcontractor has provided or provides such satisfactory reasonable assurances of continued performance and financial responsibility to complete his work including any warranty work as the contractor in his reasonable discretion may require, including, but not limited to, a payment and performance bond.

(E) The subcontractor shall, within ten days from the subcontractor's receipt of retainage from the contractor, pass through payments to lower tier subcontractors and shall reduce each lower tier subcontractor's retainage reduced by the contractor, provided that the value of each lower tier subcontractor's work complete and in place equals 50 percent of this subcontract value, including approved change orders and other additions to the subcontract value and provided, further, that the work of the lower tier subcontractor is proceeding satisfactorily and the lower tier subcontractor has provided or provides such satisfactory reasonable assurances of continued performance and financial responsibility to complete his work including any warranty work as the subcontractor in his reasonable discretion may require, including, but not limited to, a payment and performance bond.

- (c) This Code section shall not apply to:
- (1) Any contracts let by the Department of Transportation of this state for the construction, improvement, or maintenance of roads or highways in this state or purposes incidental thereto: or
 - (2) Any contracts whose value or duration at the time of the award does not exceed \$150,000.00 or 45 days in duration.
- (d) Contract and subcontract provisions inconsistent with the benefits extended to contractors, subcontractors, and lower tier subcontractors by this Code section shall be unenforceable: provided, however, that nothing in this Code section shall render unenforceable any contract or subcontract provisions allowing greater benefits to be extended to such contractors, subcontractors, or lower tier subcontractors, the provisions and benefits of this Code section being minimal only.
- (e) Nothing shall preclude a payer under this Code section, prior to making a payment, from requiring the payee to submit satisfactory evidence, including but not limited to all and/or any invoices, that all payrolls, material bills, and other indebtedness connected with the work have been paid.

In addition to the foregoing, before the Owner can implement the above amendment to the contract, a letter of consent from the Surety Company must be provided to the Owner ten (10) days prior to the contractor's request to the Owner to withhold no more retainage under the terms of Exhibit “A”.

END OF EXHIBIT "A"

SECTION PBP- PERFORMANCE BOND - PAYMENT BOND

The form for the Performance Bond and Payment Bond shall be:

PERFORMANCE BOND

Performance Bond (Contractor), Gwinnett County Public Schools, Version dated 08.29.03,
pages 1-4, as bound in this Section

Surety's Power of Attorney Attached to Performance Bond

PAYMENT BOND

Payment Bond (Contractor), Gwinnett County Public Schools, Version dated 08.29.03,
pages 1-4, as bound in this Section

Surety's Power of Attorney Attached to Payment Bond

End of Section PBP

PERFORMANCE BOND (Contractor)

_____, a corporation duly
[Insert Proper Name of Surety]

organized and existing under the laws of the State of _____, as surety ("Surety"), and

_____, as principal
[Insert Proper Name of Contractor]

("Contractor"), enter into, execute this bond ("Performance Bond"), and bind themselves in favor of the Gwinnett County Board of Education as obligee ("Owner"), in the penal sum of

_____ dollars (\$_____), as of _____.
[Insert Penal Sum in words and numerals] *[Insert Date of Construction Contract]*

WHEREAS, the Contractor has executed a contract with the Owner of even date herewith ("Construction Contract") for construction of:

[Insert Description and Location of the Project]

("Project"); and

WHEREAS, the Owner has required the Contractor to furnish this Performance Bond containing the terms and conditions set forth herein as a condition to executing the Construction Contract with the Contractor;

NOW THEREFORE, the Surety and the Contractor, both jointly and severally, and for themselves, their heirs, administrators, executors and successors agree:

1.

The Construction Contract is hereby incorporated herein and by reference made a part hereof to the same extent and effect as though it were copied verbatim herein. The Surety and the Contractor are bound for the full performance of the Construction Contract, including, without exception, all of its terms and conditions, both express and implied.

2.

If the Contractor is in default of the Construction Contract and the Owner, by written notice to the Contractor and the Surety, declares the Contractor to be in default and terminates the right of the Contractor to proceed, the Surety shall thereupon promptly notify the Owner in writing as to which of the actions permitted to the Surety in Paragraph 3 it will take.

3.

Upon default and termination of the Contractor and notice to the Contractor and Surety as provided in Paragraph 2 above, the Surety shall, within 30 days, proceed to take one or, at its option, more than one of the following courses of action:

(A) Proceed itself, or through others acting on its behalf, to complete full performance of the Construction Contract including, without limitation, correction of defective and nonconforming work performed by or on behalf of the Contractor. During such performance by the Surety, the Owner shall pay the Surety from its own funds only such sums as would have been due and payable to the Contractor in the absence of the default and termination.

(B) Applicable law permitting, and with the prior written consent of the Owner, obtain bids or proposals from contractors previously identified as being acceptable to the Owner, for full performance of the Construction Contract. The Surety shall furnish the Owner a copy of such bids or proposals upon receipt of same. The Surety shall promptly select, with the agreement of the Owner, the best responsive bid or proposal and shall promptly tender the contractor submitting it, together with a contract for fulfillment and completion of the Construction Contract executed by the completing contractor, to the Owner for the Owner's execution. Upon execution by the Owner of the contract for fulfillment and completion of the Construction Contract, the completing contractor shall furnish to the Owner a performance bond and a separate payment bond, each in the form of those bonds previously furnished to the Owner for the Project by the Contractor. Each such bond shall be in the penal sum of the (1) fixed price for completion, (2) guaranteed maximum price for completion, or (3) estimated price for completion, whichever is applicable. The Owner shall pay the completing contractor from its own funds only such sums as would have been due and payable to the Contractor under the Construction Contract as and when they would have been due and payable to the Contractor in the absence of the default and termination. To the extent that the Owner is obligated to pay the completing contractor sums which would not have then been due and payable to the Contractor under the Construction Contract, the Surety shall provide the Owner with such sums in a sufficiently timely manner that the Owner can utilize such sums in making timely payment to the completing contractor; or,

(C) Take any and all other acts, if any, mutually agreed upon in writing by the Owner and the Surety.

4.

In addition to those duties set forth hereinabove, the Surety shall promptly pay the Owner all loss, costs and expenses resulting from the Contractor's default(s), including, without limitation, fees, expenses and costs for architects, engineers, consultants, testing, surveying and attorneys, liquidated or actual damages, as applicable, for delay in completion of the Project, and fees, expenses and costs incurred at the direction, request, or as a result of the acts or omissions of the Surety.

5.

In no event shall the Surety be obligated to the Owner hereunder for any sum in excess of the Penal Sum. As used in this Performance Bond, the term "Penal Sum" means the amount stated as the penal sum in the preamble of this Performance Bond, as that amount may be adjusted from time to time pursuant to Paragraph 6 below.

6.

The Surety waives notice of any changes to the Construction Contract including, without limitation, changes in the contract time, the contract price, or the work to be performed. If the total amount payable by the terms of the Construction Contract is increased to an amount in excess of the then current Penal Sum, then, automatically and without notice to or any action required of any party, the Penal Sum shall be increased as the total amount payable by the terms of the Construction Contract is increased.

7.

This Performance Bond is provided by the Surety for the sole and exclusive benefit of the Owner, together with its successors or assigns. No other party, person or entity shall have any rights against the Surety hereunder.

8.

Any and all notices to the Surety, the Contractor or the Owner shall be given by Certified Mail, Return Receipt Requested, to the address set forth for each party below:

Surety: _____

Attn: _____

Contractor: _____

Attn: _____

Owner: Gwinnett County Board of Education

Attn: _____

9.

Any statutory limitation, which may be contractually superseded, to the contrary notwithstanding, any action hereon may be instituted so long as the applicable statute of limitations governing the Construction Contract has not run or expired.

CONTRACTOR:

SURETY:

[Typed Name] [Seal]

[Typed Name] [Seal]

By: _____
[Signature]

By: _____
[Signature]

[Printed Name, Title and Address]

[Printed Name, Title and Address]

PAYMENT BOND (Contractor)

_____, a corporation duly
[Insert Proper Name of Surety]
organized and existing under the laws of the State of _____, as surety ("Surety"), and
_____, as principal ("Contractor"), enter
[Insert Proper Name of Contractor]
into, execute this bond ("Payment Bond"), and bind themselves in favor of the Gwinnett County Board of
Education, as obligee ("Owner") in the penal sum of
_____ dollars (\$_____), as of _____.
[Insert Penal Sum in words and numerals] *[Insert Date of Construction Contract]*

WHEREAS, the Contractor has executed a contract with the Owner of even date herewith
("Construction Contract") for construction of:

[Insert Description and Location of the Project]

("Project"); and,

WHEREAS, the Owner has required the Contractor to furnish this Payment Bond containing the
terms and conditions set forth herein as a condition to executing the Construction Contract with the
Contractor;

NOW THEREFORE, the Surety and the Contractor, both jointly and severally, and for
themselves, their heirs, administrators, executors and successors agree:

1.

The Construction Contract is hereby incorporated herein and by reference made a part hereof to
the same extent and effect as though it were copied verbatim herein. The Surety and the Contractor are
bound for the full performance of the Construction Contract including without exception all of its terms and
conditions, both express and implied, and, without limitation, specifically including Contractor's obligation
to pay for labor, materials, machinery, and equipment provided in connection with the Construction
Contract performance.

2.

For purposes of this Payment Bond, Beneficiary is defined as any subcontractor or other person
supplying labor, materials, machinery, or equipment in the prosecution of the work provided for in the
Construction Contract, or any other person entitled to the protection of this Payment Bond pursuant to the
provisions of Title 36, Chapter 91, Official Code of Georgia Annotated.

3.

Every Beneficiary who has not been paid in full for labor or material furnished in the prosecution of the work on the Project before the expiration of a period of ninety (90) days after the day on which the last of the labor was done or performed by such person or the material or equipment or machinery was furnished or supplied by such person for which such claim is made, or when he or she has completed his or her subcontract for which claim is made, shall have the right to bring an action on this Payment Bond for the amount, or the balance thereof, unpaid at the time of the commencement of such action and to prosecute such action to final execution and judgment for the sum or sums due such person; provided, however, that:

(A) Any person having a direct contractual relationship with a subcontractor but no contractual relationship, express or implied, with the Contractor where the Contractor has not complied with the notice of commencement requirements in accordance with Code Section 36-91-92, Official Code of Georgia Annotated, shall have the right of action upon this Payment Bond upon giving written notice to the Contractor within ninety (90) days from the day on which such person did or performed the last of the labor or furnished the last of the material or machinery or equipment for which such claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the material was furnished or supplied or for whom the labor was performed or done; provided, however, that: (i) the Contractor's failure to supply a copy of the notice of commencement within ten calendar days of receipt of a written request from a subcontractor, materialman or person shall render the provisions of this paragraph 3(A) inapplicable to such subcontractor, materialman or person, and (ii) the Contractor's failure to file a notice of commencement shall render the notice to contractor requirements of this paragraph 3(A) inapplicable.

(B) Any person having direct contractual relationship with a subcontractor but no contractual relationship express or implied with the Contractor where the Contractor has complied with the notice of commencement requirements in accordance with subsection (a) of Code Section 36-91-92, Official Code of Georgia Annotated, shall have the right of action on this Payment Bond provided such person shall, within thirty (30) days from the filing of the notice of commencement or thirty (30) days following the first delivery of labor, material, machinery or equipment, whichever is later, give to the Contractor a written notice setting forth:

(i) The name, address and telephone number of the person providing labor, material, machinery or equipment;

(ii) The name and address of each person at whose instance the labor, material, machinery or equipment is being furnished;

(iii) The name and the location of the Project; and

(iv) A description of the labor, material, machinery or equipment being provided and, if known, the contract price or anticipated value of the labor, material, machinery or equipment to be provided or the amount claimed to be due, if any; and

(C) Nothing contained in this Payment Bond shall limit the right of action of a Beneficiary to the ninety (90) day period referenced in paragraph 3(A) above.

The notice required under paragraph 3(A) of this Payment Bond may be served by registered or certified mail, postage prepaid, or statutory overnight delivery, duly addressed to the Contractor, at any place at which the Contractor maintains an office or conducts his or her business or at his or her residence, by depositing such notice in any post office or branch post office or any letter box under the control of the United States Postal Service; alternatively, notice may be served in any manner in which the sheriffs of the State of Georgia are authorized by law to serve summons or process.

Every action instituted on this Payment Bond shall be brought in the name of the Beneficiary, without the Owner being made a party thereto.

4.

In no event shall the Surety be obligated hereunder for sums in excess of the Penal Sum. As used in this Payment Bond, the term "Penal Sum" means the amount stated as the penal sum in the preamble of this Payment Bond, as that amount may be adjusted from time to time pursuant to paragraph 5 below.

5.

The Surety waives notice of any changes to the Construction Contract including, without limitation, changes in the contract time, the contract price, or the work to be performed. If the total amount payable by the terms of the Construction Contract is increased to an amount in excess of the then current Penal Sum, then, automatically and without notice to or any action required of any party, the Penal Sum shall be increased as the total amount payable by the terms of the Construction Contract is increased. No agreement, modification, or change in the Construction Contract, change in the work covered by the Construction Contract, or extension of time for the completion of the Construction Contract shall release the Surety of this Payment Bond.

6.

No action can be instituted hereunder after one (1) year from the completion of the Construction Contract and the acceptance of the Project by the Owner and any other applicable public authorities.

7.

Unless otherwise provided herein, any and all notices to the Surety or the Contractor shall be given by Certified Mail, Return Receipt Requested, to the address set forth for each party below, including a courtesy copy to the Owner:

Surety: _____

Attn: _____

Contractor: _____

Attn: _____

Owner: Gwinnett County Board of Education

Attn: _____

8.

Notwithstanding any provision herein that may be to the contrary, this Payment Bond is intended to be a statutory payment bond under applicable laws of the State of Georgia and shall be so construed.

CONTRACTOR:

SURETY:

_____[SEAL]
[Typed Name]

_____[SEAL]
[Typed Name]

By: _____
[Signature]

By: _____
[Signature]

[Printed Name, Title and Address]

[Printed Name, Title and Address]

GWINNETT COUNTY SCHOOL DISTRICT GENERAL CONDITIONS

ARTICLE 1 GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consists of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include other documents such as bidding requirements (advertisement or invitation to bid, instructions to Bidders, sample forms, the Contractor's bid or portions of addenda relating to bidding requirements).

1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Architect and Contractor, (2) between the Owner and a Subcontractor or Sub-Subcontractor, or (2) between any persons or entities other than the Owner and Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and wherever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

1.1.7 THE PROJECT MANUAL

The Project Manual is the volume usually assembled for the Work, which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 The Contract Documents shall be signed by the Owner and Contractor as provided in the Agreement. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall identify such unsigned Documents upon request.

1.2.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contractor Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results.

1.2.4 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

1.2.5 Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

ARTICLE 2
OWNER

2.1 DEFINITION

2.1.1 The Owner is the Gwinnett County School District. The term "Owner" means the Owner or the Owner's authorized representative.

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.1 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project and a legal description of the site.

2.2.2 Except for permits and fees which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

2.2.3 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in orderly progress of the Work.

2.2.4 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, twenty copies of Drawings and Project Manuals.

2.2.5 The foregoing is in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Article 6 (Construction by Owner or by Separate Contractors), Article 9 (Payments and Completion) and Article 11 (Insurance and Bonds).

2.3 OWNER'S RIGHTS TO STOP THE WORK

2.3.1 If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Paragraph 12.2 or persistently fails to carry out Work in accordance with the Contract Documents, the Owner, by written order signed personally or by an agent specifically so empowered by the Owner in writing may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise the right for the benefit of the Contractor or any other entity, except to the extent required by Subparagraph 6.1.3.

2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

2.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a forty-eight hour period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such forty-eight hour period give the Contractor a second written notice to correct such deficiencies within a second forty-eight

hour period. If the Contractor within such second forty-eight hour period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Construction Change Directive shall be issued deducting from payments then or thereafter due the Contractor the actual cost of correcting such deficiencies, including compensation for the Architect's additional services and expenses made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

- 2.4.2 If, in the opinion of the Architect, it is evident that the Contractor has not completed or will not be able to substantially complete the Work in accordance with the contract documents due to default, negligence, or failure on the part of the Contractor, or their subcontractors, the Owner may, at its option, without prejudice, after the expiration of the second of two forty-eight hour written notices to the Contractor, complete certain portions of the Work as may be necessary, or augment the forces of the Contractor with additional manpower as may be required to complete the Work by the contracted completion date. In such case, an appropriate deductive Construction Change Directive shall be written, deducting from the contract price the actual costs incurred by the Owner to complete or augment the Work. Amount charged to the Contractor will be subject to the approval of the Architect. Such action, if taken by the Owner, shall not be interpreted by the Contractor as a termination of the contract as per Article 16 and the Contractor shall continue to carry out the Work or portions of the Work as may be required by the contract during this time frame.

ARTICLE 3 **CONTRACTOR**

3.1. DEFINITION

- 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative.

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

- 3.2.1 The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Owner pursuant to Subparagraph 2.2.2; and shall at once report to the Architect errors, inconsistencies or omissions discovered. The Contractor shall not be liable to the Owner or Architect for damage resulting from errors, inconsistencies or omissions in the Contract Documents unless the Contractor recognized such error, inconsistency or omission and knowingly failed to report it to the Architect. If the Contractor performs any construction activity knowing it involves a recognized error, inconsistency or omission in the Contract Documents without such notice to the Architect, the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

- 3.2.2 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Architect at once.
- 3.2.3 The Contractor shall perform the Work in accordance with the Contract Documents and submittals approved pursuant to Paragraph 3.12.

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

- 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless Contract Documents give other specific instructions concerning these matters.
- 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, subcontractors and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor.
- 3.3.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.
- 3.3.4 The Contractor shall be responsible for inspection of portions of Work already performed under this Contract to determine that such portions are in proper condition to receive subsequent Work.
- 3.3.5 The Contractor shall make daily reports of activities onsite and shall submit copies of these reports with each monthly Application for Payment. Each daily report shall include the following information as a minimum:

- Project name
- Contractor
- Date
- Weather/temperature
- Number of persons present for each trade working on-site
- Number of Contractor's own forces present on-site
- Equipment present on-site
- Activity and work performed on-site
- Visitors on-site

3.4 LABOR AND MATERIALS

- 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper

execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

- 3.4.2 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

3.5 **WARRANTY**

- 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

3.6 **TAXES**

- 3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely schedule to go into effect.

3.7 **PERMITS, FEES AND NOTICES**

- 3.7.1 The contractor shall secure and pay for all required governmental permits, fees, licenses, inspections, and utility costs (such as water metering devices) for the proper execution and completion of the work. The only exceptions shall be the payment of impact fees, permit fees, and development fees. Gwinnett County School District is exempt from payment of these particular fees on all school system construction projects.
- 3.7.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities bearing on performance of the Work.
- 3.7.3 It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Architect and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.
- 3.7.4 If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect and Owner, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs.

3.8 ALLOWANCES

- 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents, items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities against which the Contractor makes reasonable objection.
- 3.8.2 Unless otherwise provided in the Contract Documents:
- 3.8.2.1 materials and equipment under an allowance shall be selected promptly by the Owner to avoid delay in the Work;
 - 3.8.2.2 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
 - 3.8.2.3 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum and not in the allowances;
 - 3.8.2.4 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Clause 3.8.2.2 and (2) changes in Contractor's costs under Clause 3.8.2.3.

3.9 SUPERINTENDENT

- 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.
- 3.9.2 The Superintendent shall have supervised past projects of equal size and scope and have excellent performance references from the Owners for a minimum of three projects within a period of five years maximum. Contractors who and first and second apparent low bidders shall submit their appointed superintendent and project manager and references for review by the Owner and Architect within ten (10) days from the bid date and prior to contract signing. Owner and Architect shall have the right to reject any superintendent or project manager that does not, in their opinion have the required performance history to be in charge of this project.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

- 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

The schedule shall be a time-scaled, critical path method (CPM) network diagram showing critical path and float for each activity.

- 3.10.2 The Contractor shall prepare and keep current, for the Architect's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Architect reasonable time to review submittals. This schedule shall be submitted to the Architect prior to the first application for payment.
- 3.10.3 The Contractor shall conform to the most recently approved construction and submittal schedules.
- 3.10.4 The Owner shall be able to conduct classes without disruption or interference, move buses in and out on paved surfaces; and secure, heat, cool, light the building, and deliver food.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

- 3.11.1 The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, addenda, Change Orders and other Modifications, in good order and marked currently to record changes and selections made during construction, and in addition approved Shop Drawings, Product Data, Samples and similar required submittals including all underground utilities. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work.

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
- 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.
- 3.12.3 Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.
- 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Architect is subject to the limitations of Subparagraph 4.2.8.
- 3.12.5 The Contractor shall review, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals made by the Contractor which are not required by the Contract Documents may be returned without action.

- 3.12.6 The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect. Such Work shall be in accordance with approved submittals.
- 3.12.7 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.
- 3.12.8 The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and the Architect as given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.
- 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals.
- 3.12.10 Informational submittals upon which the Architect is not expected to take responsible action may be so identified in the Contract Documents.
- 3.12.11 When Professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications.
- 3.12.12 The Contractor shall provide upon the Architect's request a shop drawing or submittal for any item, component, or system being furnished under the contract.

3.13 USE OF SITE

- 3.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

3.14 CUTTING AND PATCHING

- 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.
- 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner

or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

3.15 CLEANING UP

3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials.

3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.16 ACCESS TO WORK

3.16.1 The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

3.17 ROYALTIES AND PATENTS

3.17.1 The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

3.18 INDEMNIFICATIONS

3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting there from, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph 3.18.

3.18.2 In claims against any person or entity indemnified under this Paragraph 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by

them or anyone for whose acts they may be liable, the Indemnification obligation under this Paragraph 3.18 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

- 3.18.3 The obligations of the Contractor under this Paragraph 3.18 shall not extend to the liability of the Architect, the Architect's consultants, and agents and employees of any of them arising out of (1) the preparation of approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Architect, the Architect's consultants, and agents and employees of any of them provided such giving or failure to give is the primary cause of the injury or damage.

ARTICLE 4

ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

- 4.1.1 The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative.
- 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.
- 4.1.3 In case of termination of employment of the Architect, the Owner shall appoint an architect against whom the Contractor makes no reasonable objection and whose status under the Contractor Documents shall be that of the former architect.

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

- 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents, and will be the Owner's representative (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the correction period described in Paragraph 12.2. The Architect will advise and consult with the Owner. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with other provisions of the Contract.
- 4.2.2 The Architect shall visit the site at least once a week to inspect and familiarize himself with the progress and quality of the Work and to determine if the Work is proceeding in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on site inspections to check quality or quantity of the Work. On the basis of on-site inspections as an architect, the Architect will keep the

Owner informed of progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work.

- 4.2.3 The Architect will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility as provided in Paragraph 3.3. The Architect will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons performing portions of the Work.
- 4.2.4 **Inspection Does Not Relieve Contractor.** Under the Contract Documents the Contractor has assumed the responsibility of furnishing all services, labor and materials for the entire Work in accordance with such documents. No provisions of this Article nor any inspection of the Work by the Owner, representatives of the Owner, engineers employed by the Architect, representatives of the Architect, or the Architect shall in any way diminish, relieve, or alter said responsibility and undertaking of the Contractor; nor shall the omission of any of the foregoing to discover or to bring to the attention of the Contractor the existence of any Work or materials injured or done not in accordance with said Contract Documents in any way diminish, relieve, or alter such obligation of the Contractor nor shall the aforesaid omission diminish or alter the rights or remedies of the Owner as set forth in the Contract Documents.
- 4.2.5 **Communications Facilitating Contract Administration.** Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate through the Architect. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.
- 4.2.6 Based on the Architect's inspections and evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.
- 4.2.7 The Architect will have authority to reject Work which does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable for implementation of the intent of the Contract Documents, the Architect will have authority to require additional inspection or testing of the Work in accordance with Subparagraphs 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.
- 4.2.8 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design

concept expressed in the Contract Documents. The Architect's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Paragraphs 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

- 4.2.9 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.4.
- 4.2.10 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will receive and forward to the Owner for the Owner's review and records written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final certificate for Payment upon compliance with the requirements of the Contract Documents.
- 4.2.11 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.
- 4.2.12 The Architect will be the interpreter of the requirements of the Contract Documents and the judge of the performance there under by both the Owner and Contractor.
- 4.2.13 The Architect will render interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and in accordance with any time limit agreed upon. Either party to the Contract may make written request to the Architect for such interpretations.
- 4.2.14 All interpretations and decisions of the Architect shall be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. In his capacity as interpreter and judge, he will endeavor to secure faithful performance by both the Owner and the Contractor.
- 4.2.15 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

4.3 CLAIMS AND DISPUTES

- 4.3.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract items, payment of money, extension of time or other relief with respect to the items of the Contract. The term "Claim" also

includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

- 4.3.2 The Contractor shall assert claims solely on the basis of (a) principles of logic and (b) principles of law to which the Contractor, itself, subscribes. It shall not protest a decision or request a conference on the ground that a Subcontractor, materialman, or supplier has protested to the Contractor. Accordingly, the Contractor shall file no claim nor shall it make a request for a conference with the Owner regarding a claim except as it shall be for the purpose of asserting in the exercise of the Contractor's best judgment such views, requests, and legal propositions as it deems the Contractor is entitled to maintain independently of any right of any Subcontractor, materialman, or supplier against the Contractor.
- 4.3.3 Decision of Architect. Claims, including those alleging an error or omission by the Architect shall be referred initially to the Architect for action as provided in Paragraph 4.4. A decision by the Architect, as provided in Subparagraph 4.4.4, shall be required as a condition precedent to litigation of a Claim between the Contractor and Owner as to all such matters arising prior to the date final payment is due, regardless of (1) whether such matters relate to execution and progress of the Work or (2) the extent to which the Work has been completed. The decision by the Architect in response to a Claim shall not be a condition precedent to litigation in the event (1) the position of Architect is vacant, (2) the Architect has not received evidence or has failed to render a decision within agreed time limits, (3) the Architect has failed to take action required under Subparagraph 4.4.4 within thirty (30) days after the claim is made, (4) forty-five (45) days have passed after the Claim has been referred to the Architect or (5) the Claim relates to a mechanic's lien.
- 4.3.4 Time Limits on Claims. Claims by either party must be made within twenty-one (21) days after occurrence of the event giving rise to such Claim or within twenty-one (21) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made by written notice. An additional Claim made after the initial Claim has been implemented by Change Order will not be considered unless submitted in a timely manner.
- 4.3.5 Continuing Contract Performance. Pending final resolution of a Claim unless otherwise agreed in writing the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.
- 4.3.6 Waiver of Claims: Final Payment. The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:
- 4.3.6.1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
 - 4.3.6.2 failure of the Work to comply with the requirements of the Contract Documents; or
 - 4.3.6.3 terms of special warranties required by the Contract Documents.

4.3.7 Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than twenty-one (21) days after the first observance of the conditions. The Architect will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within twenty-one (21) days after the Architect has given notice of the decision. If the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Paragraph 4.4.

4.3.8 Claims for Additional Cost. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Paragraph 10.3. If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds. Claim shall be filed in accordance with the procedure established herein.

4.3.9 CLAIMS FOR ADDITIONAL TIME

4.3.9.1 If the Contractor wishes to make Claim for an increase in the Contract Time, written notice shall be given within twenty-one (21) days. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

4.3.9.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the scheduled construction.

4.3.10 Injury or Damage to Person or Property. If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, of any of the other party's employees or agents, or of others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding twenty-one (21) days after first observance. The notice shall provide sufficient detail to enable the other party to

investigate the matter. If a Claim for additional cost or time related to this Claim is to be asserted, it shall be filed as provided in Subparagraphs 4.3.7 or 4.3.8.

4.4 RESOLUTION OF CLAIMS AND DISPUTES

- 4.4.1 The Architect will review Claims and take one or more of the following preliminary actions within ten (10) days of receipt of a Claim: (1) request additional supporting data from the claimant, (2) submit a schedule to the parties indicating when the Architect expects to take action, (3) reject the Claim in whole or in part, stating reasons for rejection, (4) recommend approval of the Claim by the other party or (5) suggest a compromise. The Architect may also, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim.
- 4.4.2 If a Claim has been resolved, the Architect will prepare or obtain appropriate documentation.
- 4.4.3 If a Claim has not been resolved, the party making the Claim shall, within ten (10) days after the Architect's preliminary response, take one or more of the following actions: (1) submit additional supporting data requested by the Architect, (2) modify the initial Claim or (3) notify the Architect that the initial Claim stands.
- 4.4.4 If a Claim has not been resolved after consideration of the foregoing and of further evidence presented by the parties or requested by the Architect, the Architect will notify the parties in writing that the Architect's decision will be made within seven (7) days, which decision shall be final and binding on the parties but subject to litigation. Upon expiration of such time period, the Architect will render to the parties the Architect's written decision relative to the Claim, including any change in the Contract Sum or Contract Time or both. If there is a surety and there appears to be a possibility of a Contractor's default, the Architect may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

ARTICLE 5 **SUBCONTRACTORS**

5.1 DEFINITIONS

- 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Document as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.
- 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

- 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner to Architect to reply promptly shall constitute notice of no reasonable objection.
- 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.
- 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection.
- 5.2.4 The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner or Architect make reasonable objection to such change.

5.3 SUBCONTRACTURAL RELATIONS

- 5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require such Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by items of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement, which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

- 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:
 - 5.4.1.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Paragraph 14.2 and only for those subcontract

agreements which the Owner accepts by notifying the Subcontractor in writing; and

- 5.4.1.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.
- 5.4.2 If the Work has been suspended for more than thirty (30) days, the Subcontractor's compensation shall be equitably adjusted.

ARTICLE 6
CONSTRUCTION BY OWNER
OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

- 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided elsewhere in the Contract Documents.
- 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.
- 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule and Contract Sum deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

6.2 MUTUAL RESPONSIBILITY

- 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their

activities and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

- 6.2.2 If part of the Contractor's Work depends for proper execution of results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor to report shall constitute an acknowledgment that the Owner's or separate contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.
- 6.2.3 Costs caused by delays or by improperly timed activities or defective construction shall be borne by the party responsible therefore.
- 6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Subparagraph 10.2.5.
- 6.2.5 Claims and other disputes and matters in question between the Contractor and a separate contractor shall be subject to the provisions of Paragraph 4.3 provided the separate contractor has reciprocal obligations.

6.3 OWNER'S RIGHT TO CLEAN UP

- 6.3.1 If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from the waste materials and rubbish as described in Paragraph 3.15, the Owner may clean up and allocate the cost among those responsible as the Architect determines to be just.

ARTICLE 7 **CHANGES IN THE WORK**

7.1 CHANGES

- 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.
- 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

- 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.
- 7.1.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a proposed Change Order or Construction Change Directive that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.
- 7.1.5 All Changes in the Work shall be executed in a timely manner.

7.2 CHANGE ORDERS

- 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect, stating their agreement upon all of the following:
 - 7.2.1.1 a change in the Work;
 - 7.2.1.2 the amount of the adjustment in the Contract Sum, if any; and
 - 7.2.1.3 the extent of the adjustment in the Contract Time, if any.
- 7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Subparagraph 7.3.3.
- 7.2.3 In making proposals for consideration of Change Orders, the allowance for overhead and profit combined, included in the total cost to the Owner, shall be based upon the following schedule:
 - 7.2.3.1 To the Contractor for Work which he performs with his own forces not to exceed twenty percent (20%) of his net additional cost.
 - 7.2.3.2 To a Subcontractor for Work which he performs with his own forces not to exceed twenty percent (20%) of his net additional cost.
 - 7.2.3.3 To the Contractor for Work which is performed by a Subcontractor not to exceed seven and one-half percent (7½%) of the amount due the Subcontractor.
- 7.2.4 Pending final determination of cost to the Owner, amounts not in dispute may be included in Applications for Payment. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the

Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

- 7.2.5 If the Owner and Contractor do not agree with the adjustment in Contract Time or the method for determining it, the adjustment or the method shall be referred to the Architect for determination.

7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

7.3.3.1 mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

7.3.3.2 unit prices stated in the Contract Documents or subsequently agreed upon;

7.3.3.3 in the case of Paragraph 2.4 above, actual costs incurred by Owner.

7.3.4 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

7.3.5 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

7.4 MINOR CHANGES IN THE WORK

7.4.1 The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 8
TIME

8.1 DEFINITIONS

- 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.
- 8.1.2 The date of commencement of the Work is the date established in the Agreement. The date shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible.
- 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Paragraph 9.8.
- 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.
- 8.1.5 The term "working day" as used in the contract documents shall mean a day when premium pay is not required.

8.2 PROGRESS AND COMPLETION

- 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.
- 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor. The date of commencement of the Work shall not be changed by the effective date of such insurance.
- 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.
- 8.2.4 The Owner will require that the Contractor increase his work effort to achieve a six (6) day, ten (10) hour per day work week upon the determination that the construction progress is two (2) weeks behind the construction schedule as required by the General Conditions.

8.3 DELAYS AND EXTENSIONS OF TIME

- 8.3.1 If the Contractor is delayed at any time in progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control, or by other causes which the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Paragraph 4.3.

8.4 DELAYS DUE TO ADVERSE WEATHER

8.4.1 Completion time will not be extended for normal bad weather. The time for completion as stated in the Contract Documents includes due allowance for days on which Work cannot be performed out-of-doors. For the purpose of this contract, the Contractor agrees that he may expect to lose working days to weather in accordance with the following table:

January-14 days	May-6 days	September-3 days
February-14 days	June-4 days	October-4 days
March-10 days	July-4 days	November-7 days
April-7 days	August-4 days	December- 10 days

8.4.2 If the total accumulated number of working days lost to the weather from the start of Work until the building is enclosed exceeds the total accumulated number to be expected for the same period from the table above, time for completion will be extended by the number of calendar days needed to include the excess number of working days lost. No extension will be made for days of bad weather occurring after the building is enclosed. Furthermore, should a project fall behind the Contractor's original construction schedule, no extensions will be given for inclement weather days beyond the scheduled dry-in date plus any additional days due Contractor during such originally scheduled period. No changes in the Contract Sum will be authorized because of adjustment of Contract Time due to weather.

ARTICLE 9 **PAYMENTS AND COMPLETION**

9.1 CONTRACT SUM

9.1.1 The Contract Sum is stated in the Agreement, and including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Architect a Schedule of Values properly allocated to various portions of the Work, prepared in the format shown in the project manual and supported by such data to substantiate its accuracy as the Architect may require. Upon receipt, the Architect/Engineer shall review and examine the Contractor's Schedule of Values, together with any supporting documentation or data which the Owner or the Architect/Engineer may require from the Contractor. The purpose of such review and examination shall be to protect the Owner from an unbalanced Schedule of Values which allocates greater value to certain elements of the Work than is indicated by such supporting documentation or data, or than is reasonable under the circumstances. If the Schedule of Values is not found to be

appropriate, or if the supporting documentation or data is deemed to be inadequate, and unless the Owner directs the Architect/Engineer to the contrary in writing, the Schedule of Values shall be returned to the Contractor for revision or supporting documentation or data. After making such examination, if the Schedule of Values is found to be appropriate as submitted, or if necessary, as revised, the Architect/Engineer shall sign the Schedule of Values thereby indicating its informed belief that the Schedule of Values constitutes a reasonable, balanced basis for payment of the Contract Price to the Contractor. This Schedule shall be used as a basis for reviewing the Contractor's Applications for Payment.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 Application for payment with supporting data shall be delivered to the architect on or before the first day of the month. The form of the Application for Payment shall be DE Form 0263, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet with schedule of values, and DE Form 0264 Summary of Materials Stored Affidavit. This procedure shall be followed in order for the Architect to review the Work and approve payment in time for the Owner to make payment on the first Friday following the fifteenth of the same month. The Owner shall make progress payments on account of the Contract for 90% (10% will be retained) of the value of the Work properly performed, based on the Contract Sum, including Owner approved and signed Change Orders, and materials suitably stored at the site thereof, all as estimated by the Architect, less the aggregate of previous payments, until one-half (50%) of the Contract Sum is due (including all Owner approved and signed Change Orders).

9.3.2 Provided that:

9.3.2.1 the Work is not behind schedule;

9.3.2.2 the Work is being performed in a satisfactory manner in compliance with the Contract as determined by the Architect; and,

9.3.2.3 there are no outstanding claims on the property; (Contractor shall submit, with payment application, a lien release form for each subcontractor requesting payments.)

Further payments shall be made in the amount of 100% of the value of the Work properly performed and of materials suitably stored at the site thereof.

9.3.3 If:

9.3.3.1 the Work falls behind the progress schedule by as much as 10%;

9.3.3.2 the Work is being performed in an unsatisfactory manner or is non compliant with the Contract Documents as determined by the Architect; or

9.3.3.3 there are outstanding claims on the property,

the Owner shall reinstate the 10% retainage on all progress payments to be paid while one or more of such conditions continues to exist. The Contractor shall be given written

- notice by the Architect of the reinstatement of the retainage. If the Contractor's actual progress becomes more than 10% behind the Contractor's anticipated progress, the Owner may direct the withholding of payments to the Contractor in amounts equal to the percentage behind the Contractor's anticipated progress, in addition to the 10% described in all Items of Article 9.
- 9.3.4 If the Contractor recovers all lost time and puts the Work back on schedule and remedies all breaches referenced in Subparagraph 9.3.3, further payments shall be as described in Subparagraph 9.3.2.
- 9.3.5 Such applications for payment shall not include amounts the Contractor does not intend to pay to a Subcontractor or material supplier because of a dispute or other reason.
- 9.3.6 If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably store off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.
- 9.3.7 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment, all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

9.4 CERTIFICATES FOR PAYMENT

- 9.4.1 The Architect will, within seven (7) days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Subparagraph 9.5.1.
- 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's inspection at the site and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information and belief, quality of the Work is in accordance with the Contract Documents. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how

or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

9.5.1 The Architect may decide not to certify payment and may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Subparagraph 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Subparagraph 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also decide not to certify payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss because of:

9.5.1.1 Defective Work not remedied;

9.5.1.2 third party claims filed or reasonable evidence indicating probably filing of such claims;

9.5.1.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

9.5.1.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

9.5.1.5 damage to the Owner or another contractor;

9.5.1.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or

9.5.1.7 persistent failure to carry out the Work in accordance with the Contract Documents.

9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

9.6 PROGRESS PAYMENTS

9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

9.6.2 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting

percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require such Subcontractor to make payments to Sub-subcontractors in similar manner.

- 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.
- 9.6.4 Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.
- 9.6.5 Payment to material suppliers shall be treated in a manner similar to that provided in Subparagraphs 9.6.2, 9.6.3 and 9.6.4.
- 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.
- 9.6.7 There are not outstanding claims or liens on the property; (Contractor shall submit, with pay request, a lien release form for each subcontractor requesting payments. See Exhibit B.)

9.7 FAILURE OF PAYMENT

- 9.7.1 If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven (7) days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven (7) days after the date established in the Contract Documents the amount certified by the Architect, then the Contractor may, upon seven (7) additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut down, delay and start-up, which shall be accomplished as provided in Article 7.
- 9.7.2 The contractor shall be entitled to interest on any payment not made within the time limits set forth in the contract documents. The interest rate shall be 4 percent per annum, compounded daily.

9.8 SUBSTANTIAL COMPLETION

- 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

- 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected. The Contractor shall proceed promptly to complete and correct items on the list. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. The Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion. When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion which shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate.
- 9.8.3 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Architect, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof as provided in the Contract Documents.

9.9 PARTIAL OCCUPANCY OR USE

- 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Subparagraph 11.3.1 and authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Subparagraph 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.
- 9.9.2 Immediately prior to such partial occupancy of use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.10 FINAL COMPLETION AND FINAL PAYMENT

9.10.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in said final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Subparagraph 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing the insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least thirty (30) days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner.

9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims. The making of final payment shall constitute a waiver of claims by the Owner as provided in Subparagraph 4.3.6.

9.10.4 Project close-out is to be obtained no later than 60 days after the date of Substantial Completion. If, in the opinion of the Owner and Architect, it is evident that the

Contractor is unwilling to bring the project to a close within the allotted time frame, and upon the issuance of two, 48 hour notices as set forth in Article 2, Paragraph 2.4.1, the Owner will then complete all unfinished work and/or assign a value to any incomplete work and documentation. The final application for payment will be adjusted accordingly.

- 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor of material supplier shall constitute a waiver of claims by the payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

- 10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.
- 10.1.2 The Contractor shall comply with provisions of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc., and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from Work arising out of and in the course of employment on Work under the Contract. The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their improper construction, maintenance, or operation. He shall erect and properly maintain at all times as required by the conditions and progress of the Work proper safeguards for the protection of workmen and the public and shall post danger warnings against any hazards created by the construction operations.

10.2 SAFETY OF PERSONS AND PROPERTY

- 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:
- 10.2.1.1 employees on the Work and other persons who may be affected thereby;
 - 10.2.1.2 The Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
 - 10.2.1.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
- 10.2.2 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

- 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.
- 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.
- 10.2.4.1 The Contractor shall notify the Architect and the Owner in writing that explosives or other hazardous materials, equipment, or unusual methods must be used in the execution of the Work, indicating precisely what, how, where, and when explosives, hazardous materials, equipment, or unusual methods will be used.
- 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.18.
- 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.
- 10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

10.3 **EMERGENCIES**

- 10.3.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Paragraph 4.3 and Article 7.

ARTICLE 11 **INSURANCE BONDS**

11.1 **CONTRACTOR'S LIABILITY INSURANCE**

- 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance

as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. In addition, the company furnishing the insurance shall have an A.M. Best Company rating of at least a Class "A" with a financial size of VI or greater. Insurance Certificates shall be accompanied by a letter stating company's current rating for verification, prior to acceptance by the Owner and execution of the formal Owner/Contractor agreement.

- 11.1.1.1 claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
 - 11.1.1.2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
 - 11.1.1.3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
 - 11.1.1.4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;
 - 11.1.1.5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting there from;
 - 11.1.1.6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
 - 11.1.1.7 claims involving contractual liability insurance applicable to the Contractor's obligations under Paragraph 3.18.
- 11.1.2 The insurance required by paragraph 11.1.1 shall be written for not less than any limits of liability listed below or required by law, whichever is greater, and shall include contractual liability insurance as applicable to the Contractor's obligations under Paragraph 3.18.
- 11.1.2.1 The Contractor agrees that, prior to the beginning of any Work by the Contractor or any Subcontractor, as the case may be, he (the Contractor) will furnish the following to the Owner for himself, and will obtain, and retain in his files for the duration of the construction period, like certificates for each Subcontractor. Certificate from insurance company showing coverage of Workmen's Compensation Insurance for the state of Georgia or a certificate from Georgia Workmen's Compensation Board showing proof of ability to pay compensation directly.
 - 11.1.2.2 Original certificate from insurance company showing coverage for the Contractor for the following:

- 11.1.2.3 Contractor's Protective and Public Liability Insurance: Taken out in the name of the Contractor.
 - 11.1.2.4 Personal Injury, including death - minimum limits of \$500,000 for each person and \$1,000,000 for each accident.
 - 11.1.2.5 Property Damage, minimum limits of \$300,000 for each accident and \$500,000 for aggregate of operations.
 - 11.1.2.6 Disposition: Certificate of insurance must be sent to Owner prior to commencement of Work. See following for endorsement required on this certificate.
- 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These certificates shall contain a statement on every policy or certificate, as the case may be, that "The insurance company agrees that Policy No. _____ shall not be canceled, changed, or allowed to lapse until thirty (30) days after the Owner and the Architect have received written notice as evidenced by return receipt of registered letter."

11.2 PROPERTY INSURANCE

- 11.2.1 The Contractor shall purchase and maintain property insurance upon the entire Work at the site, to the full (100%) insurable value thereof. This insurance shall include the interest of the Owner and the Contractor in the Work and shall insure against the perils of fire, extended coverage, and shall include all risk insurance for physical loss or damage including, without duplication of coverage, theft, vandalism, and malicious mischief.
- 11.2.2 If the property insurance requires minimum deductibles, the Contractor shall pay costs not covered because of such deductibles.
- 11.2.3 Unless otherwise provided in the Contract Documents, this property insurance shall cover portions of the Work stored off the site after written approval of the Owner at the value established in the approval and also portions of the Work in transit.
- 11.2.4 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insured.
- 11.2.5 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

- 11.2.6 If the Contractor requests in writing that insurance for risks other than those described herein or for other special hazards be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.
- 11.2.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their Subcontractors, Sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their Subcontractors, Sub-subcontractors, agents and employees, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Paragraph 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the Subcontractors, Sub-subcontractors, agents and employees of any of them by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.
- 11.2.8 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interests may reach. If after such loss no other special agreement is made, replacement of damaged property shall be covered by appropriate Change Order.
- 11.2.9 The Owner as fiduciary shall have power to adjust and settle a loss with insurers.
- 11.2.10 Partial occupancy or use in accordance with Paragraph 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

11.3 **PERFORMANCE BOND AND PAYMENT BOND**

- 11.3.1 Contractor shall furnish both a Performance Bond and Payment Bond, each in the amount of 100% of the Contract Sum, unless otherwise directed by the Owner. The surety shall be one which is authorized to do business in the State of Georgia and is listed on the current "Department of the Treasury Circular 570" with an underwriting limitation not less than the Contract Sum. In addition, company furnishing bonds shall have an A.M. Best Company rating of at least a Class "A" with a financial size of VI or greater. Bonds shall be accompanied by a letter stating company's current rating for verification, prior to acceptance by the Owner and execution of the formal Owner/Contractor agreement.

ARTICLE 12
UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING WORK

- 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Document, it must, if required in writing by the Architect, be uncovered for the Architect's observation and be replaced at the Contractor's expense without change in the Contract Time.
- 12.1.2 If a portion of the Work has been covered which the Architect has not specifically requested to observe prior to its being covered, the Architect may request to see such Works and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is not in accordance with the Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

12.2 CORRECTION OF WORK

- 12.2.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby.
- 12.2.2 If within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Subparagraph 9.8.2, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This period of one year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This obligation under this Subparagraph 12.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.
- 12.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.
- 12.2.4 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Paragraph 2.4. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by

written notice from the Architect, the Owner may remove it and store the salvageable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten (10) days after written notice, the Owner may upon ten (10) additional days' written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

12.2.5 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contracts caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

12.2.6 Nothing contained in this Paragraph 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one (1) year as described in Subparagraph 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

12.3 ACCEPTANCE OF NONCONFORMING WORK

12.3.1 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 **MISCELLANEOUS PROVISIONS**

13.1 GOVERNING LAW

13.1.1 The Contract shall be governed by the law of the State of Georgia.

13.2 SUCCESSORS AND ASSIGNS

13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

13.3 WRITTEN NOTICE

- 13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.
- 13.3.2 Written notice transmitted via facsimile (FAX) shall NOT be accepted by the owner.

13.4 RIGHTS AND REMEDIES

- 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.
- 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.5 TESTS AND INSPECTIONS

- 13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so the Architect may observe such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.
- 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Subparagraph 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so the Architect may observe such procedures. The Owner shall bear such costs except as provided in Subparagraph 13.5.3.
- 13.5.3 If such procedures for testing, inspection or approval under Subparagraphs 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses.

- 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.
- 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly, and where practicable, at the normal place of testing.
- 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

13.6 DRUG-FREE WORKPLACE ACT

- 13.6.1 The Contractor acknowledges that he is fully aware of the contents and requirements of Chapter 24 of Title 50 of the Official Code of Georgia Annotated. The Contractor, upon submission of a bid or proposal in connection with the Contract, does thereby certify that he and his Subcontractors are in compliance with the Drug-Free Workplace Act.

13.7 PUBLIC EMPLOYEE HAZARDOUS CHEMICAL AND RIGHT TO KNOW ACT OF 1988

- 13.7.1 The Contractor acknowledges that it is fully aware of the contents and requirements of Chapter 22 of Title 45 of the Official Code of Georgia Annotated. The Contractor by submitting a bid or proposal does thereby certify that it and its Subcontractors are in compliance with the aforesaid provisions of the law.

13.8 SECURITY AND IMMIGRATION COMPLIANCE

- 13.8.1 Contractor shall comply with the provisions of the Georgia Security and Immigration Compliance Act of 2006 (O.C.G.A. §§ 13-10-90 & 13-10-91) and the Rules of the Georgia Department of Labor implementing the Georgia Security and Immigration Compliance Act of 2006 (Rules 300-10-1-.01 through 300-10-1-.09). Contractor's obligations under this section shall include, but not be limited to, the following:
 - A. Contractor agrees to execute and comply with the Contractor Affidavit and Agreement attached hereto as Affidavit A and incorporated herein by reference.
 - B. Prior to the execution of this Agreement, Contractor must check the appropriate category below identifying the number of people employed by the Contractor. In the event the number of employees employed by the Contractor changes such that it would change the category identified below, Contractor agrees to notify the Owner in writing of such change within ten (10) days.

Number of people employed by the Contractor (check one):

- 500 or more employees _____
- 100 or more employees _____
- Fewer than 100 employees _____

C. Contractor agrees to insure that all subcontractors performing work under this Agreement will comply with the requirements of the Georgia Security and Immigration Compliance Act of 2006 (O.C.G.A. §§ 13-10-90 & 13-10-91) and the Rules of the Georgia Department of Labor implementing the Georgia Security and Immigration Compliance Act of 2006 (Rules 300-10-1-.01 through 300-10-1-.09). Contractor agrees to require all subcontractors performing work under this Agreement to identify in writing the number of people employed by the subcontractor pursuant to the categories set forth in subsection 8 of this section. Contractor further agrees to maintain records of the Subcontractor Affidavit(s) and to make such Subcontractor Affidavit(s) available for inspection by the Owner at any time. See attached Affidavit B.”

13.8.2 Contractor shall complete and submit a SAVE Affidavit/Affidavit Verifying Status of Public Benefit and a copy of a Secure and Verifiable Document. A sample SAVE Affidavit is attached hereto as Affidavit C.”

13.9 EQUAL OPPORTUNITY

13.9.1 The Contractor shall maintain policies of employment as follows:

13.9.1.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

13.9.1.2 The Contractor and the Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.”

ARTICLE 14

14.1 TERMINATION BY THE CONTRACTOR

14.1.1 If the Owner repeatedly fails to perform its material obligations to the Contractor for a period of thirty (30) days after receiving written notice from the Contractor of its intent to

terminate hereunder, the Contractor may terminate performance under this Contract by written notice to the Owner and the Architect. In such event, the Contractor shall be entitled to recover from the Owner as though the Owner had terminated the Contractor's performance under this Contract for convenience pursuant to Subparagraph 16.1.1.1 hereunder.

ARTICLE 15

15.1 OWNER'S RIGHT TO SUSPEND CONTRACTOR'S PERFORMANCE

- 15.1.1 The Owner shall have the right at any time to direct the Contractor to suspend its performance, or any designated part thereof, for any reason whatsoever, or without reason. If any such suspension is directed by the Owner, the Contractor shall immediately comply with same;
- 15.1.2 In the event the Owner directs a suspension of performance under this Article 15, through no fault of the Contractor, the Owner shall pay the Contractor as full compensation for such suspension the Contractor's reasonable costs, actually incurred and paid, of:
- (1) demobilization and remobilization, including such costs paid to subcontractors;
 - (2) preserving and protecting Work in place;
 - (3) storage of materials or equipment purchased for the Project, including insurance thereon;
 - (4) performing in a later, or during a longer, time frame than that contemplated by this Contract.

ARTICLE 16

16.1 TERMINATION BY THE OWNER

- 16.1.1 The Owner may terminate this Contract in accordance with the following terms and conditions:
- 16.1.1.1 The Owner may, for any reason whatsoever, terminate performance under this Contract by the Contractor for convenience. The Owner shall give written notice of such termination to the Contractor specifying when termination becomes effective. The Contractor shall incur no further obligations in connection with the Work and the Contractor shall stop Work when such termination becomes effective. The Contractor shall also terminate outstanding orders and subcontracts. The Contractor shall settle the liabilities and claims arising out of the termination of subcontracts and orders. The Owner may direct the Contractor to assign the Contractor's right, title and interest under termination orders or subcontracts to the Owner or its designee. The Contractor shall transfer title and deliver to the Owner such completed or partially completed Work and materials, equipment, parts, fixtures, information and Contract rights as the Contractor has. When terminated for convenience, the Contractor shall be compensated as follows:

- (1) The Contractor shall submit a termination claim to the Owner and the Architect specifying the amounts due because of the termination for convenience together with costs, pricing or other data required by the Owner or the Architect. If the Contractor fails to file a termination claim within one (1) year from the effective date of termination, the Owner shall pay the Contractor, an amount derived in accordance with Subparagraph (3) below;
- (2) The Owner and the Contractor may agree to the compensation, if any, due to the Contractor hereunder;
- (3) Absent agreement to the amount due to the Contractor, the Owner shall pay the Contractor the following amounts:
 - (a) Contract prices for labor, materials, equipment and other services accepted under this Contract;
 - (b) Reasonable costs incurred in preparing to perform and in performing the terminated portion of the Work, and in terminating the Contractor's performance, plus a fair and reasonable allowance for direct jobsite overhead and profit thereon (such profit shall not include anticipated profit or consequential damages); provided however, that if it appears that the Contractor would have not profited or would have sustained a loss if the entire Contract would have been completed, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss, if any;
 - (c) Reasonable costs of settling and paying claims arising out of the termination of subcontracts or orders pursuant to Subparagraph 16.1.1.1 of this Paragraph. These costs shall not include amounts paid in accordance with other provisions hereof.
 - (d) The total sum to be paid the Contractor under this Subparagraph 16.1.1.1 shall not exceed the total Contract Price, as properly adjusted, reduced by the amount of payments otherwise made, and shall in no event include duplication of payment

16.1.1.2 If the Contractor does not perform the Work, or any part thereof, in a timely manner, supply adequate labor, supervisory personnel or proper equipment or materials, or if it fails to timely discharge its obligations for labor, equipment and materials, or proceeds to disobey applicable law, or otherwise commits a violation of a material provision of this Contract, then the Owner, in addition to any other rights it may have against the Contractor or others, may terminate the performance of the Contractor and assume possession of the Project site and of all materials and equipment at the site and may complete the Work. In such case, the Contractor shall not be paid further until the Work is complete. After final completion has been achieved, if any portion of the Contract Price, as it

may be modified hereunder, remains after the cost to the Owner of completing the Work, including all costs and expenses of every nature incurred, has been deducted by the Owner, such remainder shall belong to the Contractor. Otherwise, the Contractor shall pay and make whole the Owner for such cost. This obligation for payment shall survive the termination of the Contract. In the event the employment of the Contractor is terminated by the Owner for cause pursuant to this Subparagraph 16.1.1.2 and it is subsequently determined by a Court of competent jurisdiction that such termination was without cause, such termination shall thereupon be deemed a Termination for Convenience under Subparagraph 16.1.1.1 and the provisions of Subparagraph 16.1.1.1 shall apply.

ARTICLE 17

17.1 LEGAL JURISDICTION

This agreement is made and delivered in Gwinnett County, Georgia. The Contractor and the Owner consent and agree that the Superior Court of Gwinnett County, Georgia shall have jurisdiction and venue over any action between the parties listed in The Gwinnett County School District on Standard Form of Agreement Between Owner and Contractor.



CAUTION: You should sign an original document which has this caution printed in red.

GWINNETT COUNTY BOARD OF EDUCATION
437 Old Peachtree Road, Suwanee, Georgia 30024

Affidavit A

CONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this Affidavit the undersigned Contractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual firm, or corporation which is contracting with the Gwinnett County School District, has registered with and is participating in a federal work authorization program (any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603), in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

The undersigned further agrees that, should it employ or contract with any subcontractor(s) in connection with the physical performances of services pursuant to this contract with the Gwinnett County School District, Contractor will secure from such subcontractor(s) similar verification of compliance with O.C.G.A. 13-10-91 on the Subcontractor Affidavit provided in Rule 300-10-01-.08 or a substantially similar form. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the Gwinnett County School District at the time the subcontractor(s) is retained to perform such services.

Employment Eligibility Verification
User Identification Number

By:
Title:
Entity:

Date

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE
____ DAY OF _____, 2013.

Notary Public

My Commission Expires:

Affidavit B

SUBCONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this Affidavit the undersigned subcontractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual firm, or corporation which is engaged in the physical performance of services under a contract with _____ has registered with and is participating in a federal work authorization program (any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603), in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

Employment Eligibility Verification
User Identification Number

By: Authorized Officer or Agent
Subcontractor Name:

Date

Title of Authorized Officer or Agent
of Subcontractor

Printed Name of Authorized Officer
or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE
____ DAY OF _____, 2013.

Notary Public

My Commission Expires:

Affidavit C

O.C.G.A. § 50-36-1(e)(2) SAVE Affidavit

By executing this affidavit under oath, as an applicant for a public benefit, as referenced in O.C.G.A. § 50-36-1, from the Gwinnett County School District, the undersigned applicant verifies one of the following with respect to the application for a public benefit:

- 1) _____ I am a United States citizen.
- 2) _____ I am a legal permanent resident of the United States.
- 3) _____ I am a qualified alien or non-immigrant under the Federal Immigration and Nationality Act with an alien number issued by the Department of Homeland Security or other federal immigration agency.

My alien number issued by the Department of Homeland Security or other federal immigration agency is: _____.

The undersigned applicant also hereby verifies that he or she is 18 years of age or older and has provided at least one secure and verifiable document, as required by O.C.G.A. § 50-36-1(e)(1), with this affidavit.

The secure and verifiable document provided with this affidavit can best be classified as:

_____.

In making the above representation under oath, I understand that any person who knowingly and willfully makes a false, fictitious, or fraudulent statement or representation in an affidavit shall be guilty of a violation of O.C.G.A. § 16-10-20, and face criminal penalties as allowed by such criminal Statute.

Executed in _____ (City), _____ (State).

Signature of Applicant

Printed Name of Applicant

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE
___ DAY OF _____, 2013.

Notary Public

My Commission Expires:

SECTION 00 73 00

The following supplements modify, delete or add to the "General Conditions of the Contract for Construction, Gwinnett County Board of Education". Where any article, paragraph or sub-paragraph in the General Conditions is supplemented by one of the following paragraphs, the provisions of such article, paragraph, or sub-paragraph shall remain in effect and the supplemental provisions shall be considered added thereto. Where any article, paragraph or sub-paragraph, in the General Conditions is amended, voided, or superseded by any of the following paragraphs, the provisions of such article, paragraph or sub-paragraph not so amended, voided, or superseded shall remain in effect.

I. ARTICLE 2 - OWNER

A. Delete paragraph 2.2.4 and replace with the following:

1. Sets of Construction Documents may be obtained as provided for in Advertisement to Bid.
2. For construction purposes, the Architect will furnish free of charge to the successful bidding Contractor access to the Architect's ftp site to be able to download complete Construction Documents consisting of the Drawings, the Specifications, and all Addenda in .pdf format.
3. Any hard copies of Construction Documents requested by the Contractor will be supplied and billed to the Contractor.

B. Add new paragraph 2.5 COMMUNICATION:

- 2.5.1 All contact with the Owner shall be made to and through the Owner's Representative, identified in the Project Directory. The only other directions the Contractor may respond to and the Owner shall be responsible for are those issued by the Superintendent for Gwinnett County Public Schools, the Chief Operations Officer for the Department of Facilities and Operations and the Executive Director of Facility Planning and Construction, or his designated representative.
- 2.5.2 The Owner's Construction Coordinators are NOT inspectors. Their responsibility is to observe, and to work with the Architect and the Contractor in the coordination of all Owner- furnished items and any work by the Owner's personnel, coordination of construction which may directly affect existing school functions, review all paperwork and submittals such as pay requests, change orders, or shop drawings.
- 2.5.3 Correspondence from the Contractors through telefax communications is acceptable, however each fax transmittal shall be followed by an original sent to the Owner by mail.

II. ARTICLE 3 - CONTRACTOR

A. Add new paragraph 3.2.4:

- 3.2.4 In case of discrepancies or conflicts in the contract documents, the documents to hold precedence over others shall be in the following order:
 - 3.2.4.1 The Owner-Contractor Agreement (including modifications thereto).
 - 3.2.4.2 Change Orders - Those of a later date shall take precedence over those of an earlier date.

- 3.2.4.3 Written Amendments to the Contract Signed by Both Parties - Those of a later date shall take precedence over those of an earlier date.
 - 3.2.4.4 Addenda - Those of a later date shall take precedence over those of an earlier date.
 - 3.2.4.5 Clarifications
 - 3.2.4.6 Supplementary Conditions
 - 3.2.4.7 General Conditions
 - 3.2.4.8 Specifications
 - 3.2.4.9 Schedules
 - 3.2.4.10 Details - Large scale details shall control over small scale drawings.
 - 3.2.4.11 Other drawings
 - 3.2.4.12 Drawings dimensioned
 - 3.2.4.13 Drawings not dimensioned
- B. Add new paragraph 3.2.5:
- 3.2.5 Items of work not shown in the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work, but they shall be performed as if fully and correctly set forth and described in the drawings and specifications.
- C. Add new paragraph 3.2.6 as follows:
- 3.2.6 MEASUREMENTS AND DIMENSIONS
 - 3.2.6.1 Check and be responsible for correctness of all dimensions by taking measurements at the building before ordering material or doing work dependent for proper size of installation upon coordination with job conditions.
 - 3.2.6.2 Refer discrepancies between Drawings, Specifications, and Project Conditions to Architect for adjustment before work affected thereby is begun.
 - 3.2.6.3 No consideration shall be given any claim based on difference between actual dimensions and those shown on the drawings without first complying with 3.2.6.2 above.
- D. Add new paragraph 3.3.6:
- 3.3.6 All grades, lines, levels and benchmarks for the work under this Contract shall be established and maintained by the Contractor, who shall verify all grades, lines, levels and dimensions indicated on the Drawings, and shall report all discrepancies before commencing work. The Contractor shall provide and maintain well-built batter boards at corners. He shall establish and safeguard benchmarks in at least two widely separated places. As work progresses, he shall establish and safeguard benchmarks at each level and shall establish exact locations of partitions on rough floors as a guide to trades. Any costs of corrective measure necessitated by erroneous establishment of grades, lines, levels and benchmarks shall be paid for by the Contractor.
- E. Subparagraph 3.7.2, add the following:
- 3.7.2.1 The Contractor shall file a "Notice of Commencement" on each project as required on O.C.G.A. 44-14-361.5(b) and shall post a copy of notice on the project site.

- F. Add new paragraph 3.7.5:
3.7.5 Required permits, licenses, inspections and certificates shall be carefully preserved and prominently posted during the construction period at the project for the easy, convenient access by the various inspecting authorities.
- G. Add new paragraph 3.19 as follows:
3.19 PRE-CONSTRUCTION CONFERENCE
- 3.19.1 A Pre-Construction Conference shall be held prior to commencement of work. The purpose of this conference is to introduce all members of the construction team, which include the following:
- a. Owner's Representative
 - b. Architect's Representative
 - c. Contractor's Project Manager
 - d. Contractor's Superintendent
 - e. Electrical Subcontractor
 - f. HVAC Subcontractor
 - g. and to review and ensure all Contract Documents and Submittals are completed and in compliance with all Agreements. In addition, the Contractor shall submit 2 copies of all Post-Bid Information, as described below, for the Owner's and Architect's review.
- 3.19.2 A schedule of values for each major item of work included in the Contract shall be submitted on AIA Document G-703, continuation sheet and shall define both labor and materials costs for each. Provide breakdown per divisions and sections per table of contents of these specs. See sample form included in Section 01 20 00.
- 3.19.3 A statement designating all work to be performed by the Contractor's own forces shall be submitted.
- 3.19.4 A list of the name of all Sub-Contractors and names of other organizations proposed for each portion of the Work shall be properly executed on AIA document G805 - "List of Subcontractor's" - and shall be submitted for Owner's and Architect's review with 24-hour phone numbers.
- 3.19.5 The Performance Bond shall be properly executed on enclosed forms (Gwinnett County Public Schools, standard bond forms) and submitted in triplicate, as described in Section 00 61 00 - Bonds and Certificates. Bond rating letter shall be included.
- 3.19.6 The Labor and Materials Payment Bond shall be properly executed on enclosed forms and submitted in triplicate.
- 3.19.7 The Certificate for Insurance shall be properly executed on a form approved by the State Insurance Commissioner's Office and submitted in triplicate.
- 3.19.8 A list of the names of all suppliers of principal materials and equipment shall be submitted for Owner's and Architect's review.
- 3.19.9 Construction Schedule, in CPM Network format, to Architect and Owner submitted to Owner within two weeks of award of contract.

- 3.19.10 A schedule of submittals including certifications, shop drawings, product data, samples, manuals, as built drawings and guarantees with dates of proposed submittals shall be submitted.
- 3.19.11 In addition to submittal of the previous items, the following topics will be discussed. The General Contractor is encouraged to have all subcontractors represented at the conference:
 - 3.19.11.1 Introduction of all attending parties
 - 3.19.11.2 Channels and procedures for communication shall be discussed.
 - 3.19.11.3 Requests for substitution shall be issued in accordance with the requirements of Section 01 43 25 and Section 01 35 00, Para. 1.4.
 - 3.19.11.4 Issuance of RFP's (Requests for Proposals) by the Architect shall be addressed by the General Contractor within 7 calendar days of receipt thereof.
 - 3.19.11.5 Change Order compensation shall be based on figures indicated in General Conditions.
 - 3.19.11.6 Pre-construction submittals shall be issued as indicated in Supplementary Conditions, sub- paragraph 3.19.
 - 3.19.11.7 Shop drawings, samples and other project submittals shall be issued in accordance with the requirements of Specification Section 01 35 00, Para 1.3.
 - 3.19.11.8 Job Progress Meetings shall be held weekly at the job site. One weekly meeting per month will be held at the School Board Office to review the Contractor's Application for Payment. Pre-masonry, pre-roofing, pre-flooring, sample heat pump inspection and above ceiling inspection shall be held with owner, architect, general contractor and sub prior to that activity commencing.
 - 3.19.11.9 Applications for Payment shall be issued in accordance with the requirements of Article 9 of the General Conditions of the Contract for Construction and all applicable Supplementary Conditions. All Applications for Payment shall be received by the Architect no later than the first day of each month and paid by the first Friday following the 15th day of the month. Retainage shall be as described in Supplementary Conditions, paragraphs 9.3.4, 9.5 and 9.10.5. (Retainage shall be 10 percent of the amount earned for the work in place, plus the value of stored materials up to and including 50 percent completion, then 0 percent until final completion, thereby reducing retainage at final completion to 5 percent of the contract amount (including change orders), subject to the approval of the Owner and the Architect. In other words, at 50 percent project completion, retainage will be 5 percent of the contract amount, plus approved change orders, until

final completion is achieved. Retainage for individual subcontractors shall not be released separately as the subcontractors complete their work. Nor shall the retainage for individual subcontractors be reduced when payments beyond 50% of the individual contracts are released. Retainage shall only be reduced based on payments released in excess of 50% of the overall contract sum.

- 3.19.11.10 Safety precautions and programs shall be as directed by the General Contractor in accordance with the General Conditions, Article 10, and Part 1.9 in Section 01 35 00.
- 3.19.11.11 All required mockups such as brick, CMU, EIFS, joint sealers, interior and exterior door/frame assemblies, and hardware installations, painting, etc. shall be acknowledged.
- 3.19.11.12 Requests for time extension shall be issued in accordance with the requirements of the General and Supplementary Conditions, Article 8.
- 3.19.11.13 Discrepancies and conflicts in the Contract Documents shall be resolved using the order of precedence indicated in the Supplementary Conditions, paragraph 3.2.4.
- 3.19.11.14 The Date of Substantial Completion shall not be achieved and the Certificate of Substantial Completion shall not be issued prior to receipt of the official Certificate of Occupancy by the General Contractor. This requirement is indicated in Specification Section 01 70 00, Part 1.1.A. In addition, the Certificate of Substantial Completion shall only be issued in accordance with the requirements of Section 9 of the General Conditions of the Contract for Construction.
- 3.19.11.15 Contract closeout/final payment requirements are indicated in Section 01 70 00. Piecemeal delivery of final closeout documents and materials is unacceptable.
- 3.19.11.16 Materials testing shall be conducted under a separate contract by the Owner in accordance with the requirements of Section 01 45 00. The General Contractor shall note that he is responsible for payment of several testing services, as specified.
- 3.19.11.17 Immediately prior to Substantial Completion, the General Contractor shall prepare a comprehensive list of items to be corrected or completed (a punch list) for the Architect's review, in accordance with paragraph 9.8.2 of the General Conditions. The Architect shall

- then add to or delete items from the list during a Substantial Completion Inspection.
- 3.19.11.18 Permits, fees, licenses, etc. shall be addressed in accordance with the requirements of General Conditions, paragraph 3.7, all applicable Supplementary Conditions, and as follows:
- A. All work and material shall be in accordance with the National Electrical Code, the Plumbing Code, and other applicable Federal, State, County, and municipal laws, ordinances, rules and regulations pertaining to construction, and nothing in these plans or specifications shall be construed to permit work not conforming thereto. The Contractor shall consult the Architect on all deviations regarding possible noncompliance and provide all labor and materials to complete the work as required by laws, ordinances, rules and regulations as directed by the Owner at no increase in cost to the Owner. He shall first confer with the Architect or Owner before making any determinations as to changes in quality, scope and/or increases in cost.
- 3.19.11.19 Compensation for stored materials shall be as defined in the General Conditions, and as follows:
- A. Material delivered for the Contractor to locations other than the site may be taken into consideration in the preparation of pay requests at the discretion and prior approval of the Owner, provided the Contractor furnishes satisfactory evidence that he has acquired title to such material that it will be utilized on the project covered by this contract in the form of an affidavit stating such. Contractor must provide proof of acceptable insurance coverage on material stored off-site prior to payment for same as well as invoices for such stored materials indicating transfer of the property to the Owner.

III. ARTICLE 4 - ADMINISTRATION OF THE CONTRACT

- A. Add to paragraph 4.1.1: The Architect referred to in the Contract, the General Conditions, Supplementary Conditions or other documents of the contract shall mean "Cunningham Forehand Matthews & Moore Architects, Inc., 2011 Manchester Street, NE, Atlanta, GA 30324."

IV. ARTICLE 6 - WORK BY OWNER OR BY SEPARATE CONTRACTORS

A. Add paragraphs 6.1.4 and 6.1.5:

6.1.4 All Gwinnett County Schools have undergone the inspection for asbestos containing building materials that is required by AHERA (Asbestos Hazard Emergency Response Act). The Building Contractor will not be expected to remove and dispose of any asbestos containing building materials except where specifically stated. No asbestos containing building materials shall be removed and disposed of except in strict accordance with AHERA and OSHA rules and regulations and by subcontractors who are accredited and licensed to do asbestos abatement and disposal. Copies of all completed/approved certificates and other reports and documents associated with asbestos abatement procedures performed shall be provided to the Owner. The Owner reserves the right to bring in outside approved Contractors or use his own forces to remove and dispose of asbestos containing building materials if he so desires.

V. ARTICLE 7 - CHANGES IN THE WORK

A. Add new paragraph 7.1.6 as follows:

7.1.6 No extra work is to be done without a written change order or written authorization to proceed. Payment will not be authorized for any extra or changed work for which the Contractor has failed to secure such written change order. All change orders must be signed by the Owner.

B. Add new paragraph 7.2.6 as follows:

7.2.6 The following declaration from the Contractor, shall be attached to any and all Change Order proposals.
"I swear and affirm under criminal penalties for false swearing that the costs shown herein do not exceed current costs for like services or materials and do not exceed the actual costs to the Contractor therefore; and that the quantities shown do not exceed actual requirements."

C. Add new paragraph 7.2.7 as follows:

7.2.7 The General Contractor shall issue a response no later than 7 calendar days following receipt of all requests for proposals issued by the Architect concerning changes in the work.

VI. ARTICLE 8 - TIME

A. Add new paragraph 8.1.6 as follows:

8.1.6 "The Owner shall be able to conduct classes without disruption or interference; of buses in and out on paved surfaces; and secure, heat, cool, light the building, and deliver food.

B. Add to paragraph 8.2.1

1. The Contractor shall file a Notice of Commencement with the Clerk of the Superior Court of Gwinnett County no later than 15 days after physically commencing work, with a copy to the Owner and Architect. See form in Section 00 80 30-1.

- C. Add new paragraph 8.2.4 as follows:
 - 8.2.4 When requested by the Architect, the Contractor shall furnish reports as are reasonably desirable as to the progress, condition of the job and anticipated schedule of completing the various phases of the work.
- D. Add to paragraph 8.4.2:
 - 1. No extension shall be allowed for days on which total precipitation volume is less than 1/10" as recorded by the National Oceanic and Atmospheric Administration, the National Weather Service, the U.S. Army Corps of Engineers, or any other source chosen to be recognized by the Architect. No extension will be allowed for precipitation occurring on any Saturday or Sunday or nationally recognized holidays during the project life.

VII. ARTICLE 9 - PAYMENTS AND COMPLETION

- A. Add new paragraph 9.2.2:
 - 9.2.2 The schedule of values shall be prepared in the line item format on DE Form 0263, Application and Certification for Payment and on AIA Document G703 Continuation Sheet provided in Section 01 20 00, providing labor and material costs for each line item. Stored materials shall be summarized on Summary of Materials Stored Affidavit provided in Section 01 20 00.
- B. Add to paragraph 9.3.1 as follows:
 - 1. Supporting data shall include Schedule of Values from each Subcontractor requesting payment, broken down by labor and materials as the Architect requires. Copies of requisitions from subcontractors and material suppliers may be required. See sample continuation sheet at 01 20 00. Application for payment must be signed by an officer of the company, stamped and crimped with the company seal and notarized.
- C. Add to the end of subparagraph 9.3.2:
 - 9.3.2Values related to General Contractor's and Subcontractor's overhead and profit, labor burden, insurance or any monies in addition to actual invoice amount for stored materials shall not be paid until the products are incorporated into the project. Actual invoices from suppliers must accompany application for payment. Materials stored or installed shall not be paid for if required submittals have not been completely reviewed.
- D. Add to paragraph 9.3.2.1:
 - As determined, by the Architect only, from the Architect accepted, time scaled CPM schedule with monthly anticipated progress payment amounts submitted at or before the pre-construction meeting;
- E. Add new paragraph 9.9.4:
 - 9.9.4 Should the Project, or any portion thereof, be incomplete for Substantial Completion or final completion at the scheduled date or dates, the Owner shall have the right to occupy and/or complete any portion of the Project as set forth in Article 2, Paragraph 2.4.1. In such an event, the Contractor shall not be entitled to any extra compensation on account of said occupancy or by the Owner's normal full use of the project, nor shall the Contractor interfere in any way with said normal full use of the project. Further, the Contractor shall not be relieved of any responsibilities of the Contractor, including the required times of completion. Such occupancy by the Owner does not, in itself, constitute Substantial Completion nor Final Completion.

- F. Add new paragraph 9.3.3.4:
9.3.3.4 No reduction in retainage shall be incorporated as an automatic in the contract. An reduction in retainage shall only be considered on a job by job basis, based on the condition of the project at the time of issuance of the Certificate of Substantial Completion. No additional reduction in retainage will be allowed beyond that amount agreed to at the time of substantial completion. The Owner will not release remaining funds until the punch list is complete and all required close out documentation has been reviewed, accepted and turned over to the Owner.
- G. Add to end of paragraph 9.10.4: The Contractor shall pay Owner amounts equal to the actual Owner's costs of continuing to provide administrative services on this Contract, until Final Completion.
- H. Add new paragraph 9.10.6:
9.10.6 Final Payment Application - Actions and submittals which must precede or coincide with submittal of contractor's final payment application are listed in Section 01 70 00.
- I. Add new paragraph 9.11:
A. Conditions for the reduction of retainage from 10 percent to no retainage are:
1. The work is not behind schedule as determined by the Architect only, from the Architect approved, time scaled CPM schedule with monthly anticipated progress payment amounts submitted at or before the pre-construction meeting;
 2. The work is being performed in a satisfactory manner in compliance with the contract documents as determined by the Architect;
 3. There are no outstanding claims or liens on the property. Contractor shall submit, with pay request, a lien release form for each subcontractor requesting payments these lien release forms shall be properly notarized. See Exhibit "A".
 4. Further payments, with total compliance of Attachment Exhibit "A" shall be made in the amount of 100% of the value of the labor and/or materials incorporated in the work and of materials suitably stored at the site thereof unless:
 - a. The percentage of work complete falls behind the percentage required by the construction progress schedule, as described in Attachment Exhibit "A" by as much as 10%; or
 - b. The work is being performed in an unsatisfactory manner and/or non-compliant with the contract documents as determined by the Architect; or
 - c. There are outstanding claims or liens on the property.
 - d. In which event or events, the Owner shall reinstate the 10% retainage on all periodical payments to be paid while one or more of the events continues to exist. The Contractor shall be given written notice, by the Architect, of the reinstatement of the retainage. If the Contractor's actual progress becomes more than 10% behind the Contractor's anticipated progress, as described in Item 9.6.3.1.a. the Owner may direct the withholding of payments to the Contractor in amounts equal to the percentage behind the Contractor's anticipated progress, in addition to the 10% described in all Items of Article 9.

5. If the Contractor recovers all lost time and puts the work back on schedule (0% behind schedule) per schedule described in Attachment Exhibit "A" and remedies all breaches, further payments shall be as described in Attachment Exhibit "A"; unless Items recur in which event or events the Owner shall reinstate retainage.

VIII. ARTICLE 11 - INSURANCE AND BONDS

- A. Add new paragraph 11.3.2 as follows:

11.3.2 Contractor shall also provide both Performance Bond and Payment Bond for his major subcontractors, including Grading, drywall, HVAC, electrical, plumbing, roofing, steel erection and sprinkler. The sureties must be authorized to do business in the State of Georgia and listed on "Department of the Treasury Circular 570". In addition, companies furnishing bonds shall have an A.M. Best Company rating of at least a Class "A" with a financial size of VI or better. Bonds must be accompanied by letter stating company's current rating for verification prior to acceptance by the Owner and execution of the formal Owner/Contractor agreement.

IX. ARTICLE 13 - MISCELLANEOUS PROVISIONS

- A. Add new sub-paragraph 13.8 as follows: Progress and Coordination Meetings/Reports:

13.8 The General Contractor and all sub-contractors requesting funds on the pending application for payment shall attend monthly Progress and Coordination Meetings held in the Owner's office in Lawrenceville, Georgia, during the entire construction time of the project. Persons who shall attend:

- a. Contractor's Superintendent
- b. Contractor's Project Manager or Principal of the Contractor
- c. Any Sub-contractor requested to attend by the Architect or requesting funds on the pending AFP.
- d. Representative of Owner
- e. Representative of Architect
- f. In addition, weekly meetings shall be held at the job site. All parties mentioned above shall also attend the weekly meetings.

- B. Add the following new sub-paragraph 13.9 as follows:

13.9 The Contractor shall provide copies of daily reports to the Architect prepared by the on-site job superintendent to be submitted monthly with each Application for Payment and copied to the Owner. Reports shall document temperature, weather conditions, workers present on site, work being performed, and other information deemed necessary to establish a daily history of the job progress. When requested by the Architect, the Contractor shall furnish reports as are reasonably desirable as to the progress, condition of the job and anticipated schedule of completing the various phases of the work.

END OF SUPPLEMENTARY CONDITIONS

SECTION 010200 - PHASINGPART 1 - GENERALRELATED DOCUMENTS:

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this section.

DESCRIPTION:

Work is divided into PHASES as designated herein below. Coordinate work as described below with phases as shown on the drawings for the designated phases.

The Owner, Architect and Contractor, before start of the work, shall review the various phases together and adjustments as agreed to may be made to suit the individual requirements of Owner or Contractor.

The Owner shall approve all phases of the work or any deviation.

Utility identification and relocation and installation of temporary services may proceed concurrent with installation of erosion control.

Contractor Note: No utility service can be removed or interrupted until the new service has been routed around the construction area and made active. All cut-over activities involving relocated utility services shall be coordinated with the Owner so as not to interfere with the Owner's normal activities or special events, such work shall be done after hours, weekends or holidays when necessary.

Note: Contractor is responsible for repairing immediately any damage to an active utility. Contractor shall utilize private locator service throughout project.

All work done ahead of sequence or for temporary provisions shall have existing disturbed surfaces patched to match original conditions until new construction replaces such repairs or modifications.

Contractor shall provide temporary connection for P.A., TV and Fire Alarm where new or remodeled areas are turned over to the Owner prior to completion of permanent systems and where existing system location interferes with new construction or construction activities.

PHASE I:

Following award of Contract and Notice to Proceed, Contractor shall proceed with production and submittal of Shop Drawings. All shop drawings necessary for work required in Phase I below shall be submitted within 30 days of the Notice to Proceed. All necessary materials for the Phase I work shall be on site or deliverable by May 31, 2022, this includes all materials necessary for all utility rerouting to keep utilities connected to the existing building and mobile classrooms for uninterrupted operation during the school year; installation of underground detention; relocation and connection of lift station; temporary egress modifications, and Main Mechanical Room/Yard equipment replacement and modifications. Following Notice to Proceed, Contractor shall proceed with Construction of all erosion control measures and complete them within 14 days of arrival on site with construction equipment and prior to disturbance of any grades.

Contractor shall establish and secure work area prior to beginning any physical work beyond Phase I.

SITE:

Following Notice To Proceed and installation of necessary erosion control measures and approval of necessary shop drawings, Contractor shall commence preparation for utility relocation and begin installation of rerouted utilities where new rerouted utilities run independent of existing utilities. Existing utilities and connections must be maintained and protect existing exit pathways on site until the end of the school term, May 2022.

Contractor shall coordinate with the power company and coordinate rerouting of the existing power service to the existing building and mobile classrooms with the installation schedule of the underground detention system, mechanically stabilized earth (MSE) walls, rerouted sanitary sewer, fire, domestic, and irrigation lines. Installation of the underground detention system and utility relocation shall begin on May 31, 2022. Utility relocation shall be completed as quickly as possible to minimize the time that utilities are inactive/disconnected to existing facilities and mobile classrooms. Contractor shall provide a schedule to the owner outlining when utilities will be inactive/disconnected to existing facilities and when all utilities are anticipated to be brought back online. **ALL UTILITIES MUST BE REROUTED AND CONNECTED SO THAT EXISTING FACILITIES AND MOBILE CLASSROOMS CAN RESUME NORMAL OPERATION NO LATER THEN JULY 8, 2022.**

Following the end of school term, May 2022, contractor shall commence construction of the mechanically stabilized earth (MSE) walls, new parking area along the bus drive and complete the work through binder by July 8, 2022.

BUILDING:

Contractor shall reroute storm water from roof of existing building into relocated storm lines/system so as to protect the existing building and new construction area from roof water.

Following Approval of Shop Drawing, acquisition of necessary materials, coordination with the Owner and Fire Marshal the Contractor shall commence work on the new fire alarm system evenings, weekends and holidays and complete all preparation for change over to the new system by January 1, 2023. Fire Alarm for the new addition shall be complete and online by the May 1, 2023.

Following end of school term, May 2022, Contractor shall commence modifications for temporary egress through the Media Center, window removal, cutting of existing pre-cast wall panels, installation of window infill, construction of all temporary partitions to protect new openings for connection to new addition, and demolition and roof framing/construction at the existing one-story building by July 8, 2022. See note above regarding condition of existing spaces after work has occurred in or above existing spaces.

Following end of school term, May 2022, Contractor shall commence demolition of existing HVAC equipment in the Main Mechanical Room of the existing building and complete modifications and installation of new equipment so that the entire system is functional to allow for normal operations by July 8, 2022, with connections ran to and capped for the new addition.

Following end of school term, May 2022, Contractor shall commence installation of aggregate piers (see Specification Section 024600 Aggregate Pier Soil Improvement) as shown and required in the contract documents as early as possible after the last day of students on campus and complete the aggregate pier installation no later than June 16, 2022.

PHASE II:

Contractor shall commence work on construction of the new addition following the demolition and relocation of existing utilities routed through the existing building, but no later than June 16, 2022 and substantially complete all work on the building addition by May 1, 2023. Contractor shall schedule cut-over to relocated utilities with Owner so as to not interfere with school operations.

PHASE III:

Following end of school term, May 2023, Contractor shall remove temporary egress modifications as necessary and noted on the drawings and complete removal of modifications returning modified conditions to the existing condition by July 1, 2023.

Following end of school term, May 2023, Contractor shall remove existing one-story storefront windows and install fire rated steel curtain wall windows as shown on the drawings by July 1, 2023.

CONTRACTOR NOTE: Areas of work not specifically identified in the above phasing shall be coordinated with the Owner to occur throughout the course of the project as time and spaces are available. Upon award to a successful Contractor, Contractor shall detail a schedule incorporating the above phasing and including a proposed sequence for all items not directly addressed above for the Architect and Owner to review.

CONTRACTOR NOTE: Contractor shall pay particular attention to critical completion dates noted and include in his BASE BID all necessary cost to meet the dates (manpower, premium time, i.e. night, weekend, holiday work, etc.)

CONTRACTOR NOTE: The phasing outline above does not restrict the relocation of existing, or installation of new, underground utilities and storm drainage ahead of scheduled sequencing. The Phasing outline above also does not limit the possibility of doing some work during the school year, providing the Owner approves, the work is done on holidays, weekends or after hours, school operations are not affected and spaces are left as they were originally found. Contractors shall Bid the work as Phased and coordinate with the Owner for any Phasing Modifications after Award of a Contract. Work must be coordinated with the Owner, and concrete must be used to temporarily patch walks and drives until final work is begun. Successful Contractor shall coordinate Storage and lay down with the Owner. Some trailer facilities may be located along drive, however space is limited and remote on site locations will be necessary. Protect existing site drive and parking to the greatest extent possible. Contractor shall be responsible for patching /repair/replacement, as necessary of damaged drives and parking.

SEE SHEET PH1.1 IN THE DRAWINGS FOR THE PHASING DIAGRAM FOR THE PROJECT.

End of Section 010200

SECTION 010440 - PROCEDURES AND CONTROLSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

The types of minimum requirements for procedures and performance or control work of a general nature include but are not necessarily limited to the following categories:

Payments

Coordination and meetings.

Owner access

Administrative/supervisory personnel.

Limitations for use of site.

Work on existing campuses

Special reports.

Record drawings.

Record Photos.

As Built Survey.

Tradespeople and workmanship standards.

Inspections, tests and reports.

Project Inspection Responsibility Matrix.

Utilities Protection.

OSHA

General installation provisions.

Cutting and patching.

Cleaning and protection.

Conservation and salvage.

PAYMENTS:

The schedule of values shall be prepared in such a manner that each major item of Work and each subcontracted item of Work is shown as a single line item on AIA Document G702A, APPLICATION AND CERTIFICATE FOR PAYMENT, CONTINUATION SHEET. All amounts shown in the Schedule of Values shall be rounded to the nearest whole dollar.

Roofing, Plumbing, Mechanical, Sprinkler and Electrical subcontractors shall provide Schedule of Value breakdowns.

Site work shall be broken down on a separate backup showing quantities of cut/fill, topsoil stripping, topsoil spread (quantities for both categories), storm drainage piping, structures, etc. by size and type.

Grassing and erosion control shall also have separate backup listing all phases and types of items including quantities. Erosion Control shall be broken down into Initial Installation and Maintenance.

Note: Where additional breakdowns are required they shall be on separate sheet and appear in the General Contractor's schedule of values as a single line item.

The form of Application and Certification for Payment shall be State of Georgia, Department of Education Form, DE: 0263, supported by AIA Document G702A, Continuation Sheet, and Department of Education Forms DE: 0264 with invoices and DE: 0265 showing executed Change Orders.

Provide lien waiver and release form attached at the end of this section for General Contractor and all Subcontractors who have requests for payment in any given Pay Request. Do not provide with specification header/footer.

All forms, DE:0263, shall be notarized when submitted.

The Initial Application for Payment will not be approved until the progress schedule, schedule of values, schedule of submittals, listing of subcontractors, suppliers and fabricators, listing of Contractor's staff assignments and primary consultants and anticipated pay request schedule (month by month amounts) have been received and approved by the Architect.

Subcontractors required to have bonds and/or provide additional backup/breakdown shall provide such prior to being onsite.

The Final Application for Payment will not be approved until the project closeout requirements, items specified for completion beyond time of substantial completion and incomplete work have been completed. Additionally, required construction records shall have been transmitted to the Owner, temporary facilities removed and, surplus materials, rubbish and similar elements have been removed. Contractor shall complete change over of locks and other Contractor's access provisions to Owner's property.

The Contractor shall pay to the Owner amounts equal to the Owner's actual costs of continuing to provide administrative Architectural/Engineering Services on the Owner/Contractor Contract for this project beginning sixty (60) days after the required time has elapsed for completion of each phase.

LIMITATIONS FOR USE OF SITE:

General: In addition to site utilization limitations and requirements shown on drawings, and indicated by other contract documents, administer allocation of available space equitably among entities needing access and space, so as to produce best overall efficiency in performance of total work of project. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.

Access and storage of material space is limited. Coordinate with the Owner all site usage and space utilization.

WORK AT EXISTING CAMPUSES:

In all remodeling, renovating or additions to existing school buildings, particular attention shall be paid so that all work shall be so scheduled to minimize interruptions in the normal school activities.

Owner shall be notified of all proposed mechanical, electrical or plumbing outages a minimum of 48 hours prior to the occurrence for any outage not to exceed one hour. All electrical outages and all other utility outages of longer duration shall only be scheduled after normal school hours, on weekends, or during school holidays.

In all cases a construction fence shall be constructed to enclose the work area,, storage areas, Contractor and his employee parking.

The Owner reserves the option to retain any removed materials and equipment he selects. The Contractor shall disconnect , remove and deliver items selected to the Board of Education Central Warehouse at 610 West Crogan Street, Lawrenceville, Georgia. The Contractor shall remove and dispose of all other material.

All workmen shall be fully clothed and shall be expected to exhibit acceptable behavior. The use of tobacco, alcohol and drug products is prohibited on all Gwinnett County Public School properties. Association with any student or teacher on campus shall be prohibited. Firearms are not allowed on GCPS property, not even in locked vehicles. Contractor's personnel are not to utilize school restroom, cafeteria or telephone facilities. Failure to comply with these requirements can subject personnel to being banned from the campus.

ADMINISTRATIVE/SUPERVISORY PERSONNEL:

Contractor shall provide separate personnel for the functions of Project Manager and Superintendent.

The General Contractor shall have supervisory personnel on site at all times when work is underway regardless of parties working. Individual subcontractors shall also have supervisory personnel on site whenever their forces are working onsite. All subcontractors working onsite shall maintain English speaking supervisory personnel onsite at all times, capable of reading drawings and specifications and communicating with their employees and with the General Contractor.

ACCESS TO AND OCCUPANCY OF BUILDING FOR OWNER'S INSTALLATION WORK:

Right of access to, and occupancy of, the building during construction is reserved by the Owner for its agents and contractors, for erecting and installing equipment, or other appliances, fixtures, furniture, or structure not included in the Contract with the Contractor. The Owner hereby relieves the Contractor of all liability from damage or injury to the building or neighboring premises, the public, or workmen of either the Contractor or Owner caused by such work in charge of the Owner, its agents or contractors. Occupancy of the building by the Owner, its agents or contractors, for the purpose of said work, shall not in any way signify the acceptance of the building work being done under this Contract in whole or in part.

RECORD DRAWINGS:

The record set of drawings shall be white prints and will be furnished by the Architect, and these drawings shall be used for no other purposes. Changes in various items shall be differentiated in red.

RECORD PHOTOGRAPHS:

Contractor shall provide the Owner with monthly aerial photographs of the project, four (4) views, submitted with each monthly payment Application. Provide electronic copies as digital files, which may be emailed.

AS BUILT SURVEY:

The contractor shall submit to the Architect an As-Built survey for use in verifying that the work performed complies with the requirements of the contract. The survey shall be performed by an independent, Georgia Licensed land surveyor selected and paid for by the contractor and approved by the Architect. The survey shall include the entire school site and incorporate the new addition.

Surveyor shall provide a detailed As-Built topographic and utility survey. The requirements for the survey shall include:

Locate all features required to show compliance with contract documents. Locate horizontal features as follows:

+/- 0.05' for building corners and line.

+/- 0.10' for drainage and utility structures (tops and inverts).

+/- 0.10' for pavements, walks and other improvements

The topographic and utility survey shall meet following requirements:

Grid: Maximum of 25'-0" grid.

Contour Interval: Maximum 1'-0".

Spot elevations at all building corners, top of retaining walls, grade at top and base of retaining walls, grade at top and base of stairs and landings, ramps and landings: $\pm 0.05'$. Topo shall reflect all site improvements, including sidewalks, curb cuts, ramps, pads, etc. with appropriate elevation information. Benchmark shall be identified.

All buried utilities shall be shown and identified.

The topographic and utility survey shall be completed within thirty (30) calendar days of the completion of the site grading activities; other features at completion of the work.

Survey data shall be furnished to the Architect utilizing both printed and electronic file formats.

Provide 1 original and 3 copies. Each sheet shall contain an original surveyor's seal and signature.

Provide two CDs containing survey data in a CAD version which is fully compatible with Auto CAD Architecture 2012.

Upon receipt of survey data, the Architect will verify that grades, elevations, lines and inverts comply with the contract provisions.

Where results of required survey prove unsatisfactory and do not indicate compliance of related work with requirements of Contract Documents, re-surveys will be the responsibility of the Contractor.

ALL UNDERGROUND UTILITY PIPING SHALL BE LOCATED AND DIMENSIONED ON THE RECORD SET OF DRAWINGS BY THE CONTRACTOR.

TRADES PERSONS AND WORKMANSHIP STANDARDS:

General: Instigate and maintain procedures to ensure that persons performing work at site are skilled and knowledgeable in methods and craftsmanship needed to produce required quality-levels for workmanship in completed work. Remove and replace work which does not comply with workmanship standards as specified and as recognized in the construction industry for applications indicated. Remove and replace other work damaged or deteriorated by faulty workmanship or its replacement.

INSPECTIONS, TESTS AND REPORTS:

General: Required inspection and testing services are intended to assist in determination of probable compliances of work with requirements, but do not relieve Contractor of responsibility for those compliances, or for general fulfillment of requirements of contract documents. Specified inspections and tests are not intended to limit Contractor's quality control program. Afford reasonable access to agencies performing tests and inspections.

Owner's Tests: Where tests or inspections are indicated as Owner's responsibility, Owner will engage independent testing agency to perform required services.

See applicable Sections, Divisions 2 - 16, for required tests.

PROJECT INSPECTIONS RESPONSIBILITY MATRIX:

See matrix attached at the end of this section.

OCCUPATIONAL SAFETY AND HEALTH ACT:

The Contractor shall comply with the Occupational Safety and Health Act of 1970, as amended, and the regulations promulgated thereunder.

UTILITIES PROTECTION LAW (DIG LAW):

Comply with the Georgia Utilities Protection Law. Notice must be given to the Utilities Protection Center (1-800-282-7411 throughout Georgia; 325-5000 Atlanta Area Only) three (3) working days preceding the day the work (digging) is to begin. This notice must contain County (where project is located), Town (or closet city or town), Location (Street Address), Type of Work to be done, Name of Contractor, Company Name and Address, Telephone Number, Which Company/Individual (the work is being done for), Date and Time the Contractor is planning to dig.

CONTRACT DOCUMENTS: Twenty (20) sets of Contract Documents will be issued to the Contractor for construction, free of charge. Contractor may receive a combination of full and half scale plans if desired. Additional sets will be available for the cost of production.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTIONGENERAL INSTALLATION PROVISIONS:

Installer's Inspection of Conditions: Require Installer of each major unit of work to inspect substrate to receive work, and conditions under which work will be performed, and to report (in writing to Contractor) unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

Manufacturer's Instructions: Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation, to extent these are more explicit or more stringent than requirements indicated in contract documents.

Inspect each item of materials or equipment immediately prior to installation, and reject damaged and defective items.

Provide attachment and connection devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerances if not otherwise indicated. Allow for expansion and building movements. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Architect for final decision.

Recheck measurements and dimensions of the work, as an integral step of starting each installation.

Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each unit of work, in coordination with entire work. Isolate each unit of work from non-compatible work, as required to prevent deterioration.

Coordinate enclosure (closing-in) of work with required inspections and tests, so as to minimize necessity of uncovering work for that purpose.

Mounting Heights: Where mounting heights are not indicated, mount individual units of work at industry-recognized standard mounting heights for applications indicated. Refer questionable mounting height choices to Architect/Engineer for final decision.

CUTTING AND PATCHING:

Definition: Includes cutting and patching of both previously existing work and nominally completed portions of Contract work. Excludes special categories of work identified as alterations, demolition, excavating, grading, planting, cleaning, removal/replacement of noncomplying work and similar activities; although some of these activities may require cutting and patching.

General: Do not cut-and-patch structural work in a manner resulting in reduction of load-carrying capacity or load/deflection ratio; submit proposed cutting and patching to Architect/Engineer for structural approval before proceeding. Do not cut-and-patch operational elements and safety-related components in a manner resulting in reduction of capacities to perform in manner intended or resulting in decreased operational life, increased maintenance, or decreased safety. Do not cut-and-patch work which is exposed on exterior or exposed in occupied spaces of building, in a manner resulting in reduction of visual qualities or resulting in substantial evidence of cut-and-patch work, both as judged solely by Architect. Remove and replace work judged by Architect to be cut-and-patched in a visually unsatisfactory or otherwise objectionable manner.

Engage original Fabricator/Installer to perform cutting-and-patching of structural work, operational/safety-related components, and visually-exposed work; or, if not available, engage only recognized experts; employ only proven methods.

Materials: Except as otherwise indicated or approved by Architect/Engineer, provide materials for cutting-and-patching which will result in equal-or-better work than work being cut-and-patched; in terms of performance characteristics and including visual effect where applicable. Use materials identical with original materials where feasible and where recognized that satisfactory results can be produced thereby.

Temporary Support and Protection: Provide adequate temporary support for work to be cut, to prevent failure. Do not endanger other work. Provide adequate protection of other work during cutting-and-patching, to prevent damage; and provide protection of the work from adverse weather exposure.

Cut work by methods least likely to damage work to be retained and work adjoining.

Where physical cutting action is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete work.

Comply with the requirements of applicable sections of Division 2 where cutting-and-patching requires excavating and backfilling.

Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

Where feasible, inspect and test patched areas to demonstrate integrity of work.

Restore exposed finishes of patched areas; and, where necessary extend finish restoration onto retained work adjoining, in a manner which will eliminate evidence of patching.

Where patch occurs in a smooth painted surface extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coats.

CLEANING AND PROTECTION:

General: During handling and installation of work at project site clean and protect work in progress and adjoining work on a basis of perpetual maintenance. Apply suitable protective covering on newly installed work where reasonably required to ensure freedom from damage or deterioration at time of substantial completion; otherwise, clean and perform maintenance on newly installed work as frequently as necessarily through remainder of construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

Limiting Exposures of Work: To extent possible through reasonable control and protection methods, supervise performance of work in a manner and by means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous, damaging, or otherwise deleterious exposures during construction period. Such exposures include (where applicable, but not by way of limitation) static loading, dynamic loading, internal pressures, external pressures, high or low temperatures, thermal shock, high or low humidity, air contamination or pollution, water, ice, solvents, chemicals, light, radiation, puncture, abrasion, heavy traffic, soiling, bacteria, insect infestation, combustion, electrical current, high speed operation, improper lubrication, unusual wear, misuse, incompatible interface, destructive testing, misalignment, excessive weathering, unprotected storage, improper shipping/handling, theft and vandalism.

INTERIM WAIVER AND RELEASE
UPON PAYMENT

STATE OF GEORGIA

COUNTY OF _____

THE UNDERSIGNED MECHANIC AND/OR MATERIALMAN HAS BEEN EMPLOYED BY

_____ (NAME OF CONTRACTOR) TO FURNISH _____ (DESCRIBE MATERIALS AND/OR LABOR) FOR THE CONSTRUCTION OF IMPROVEMENTS KNOWN AS _____ (TITLE OF THE PROJECT OR BUILDING) WHICH IS LOCATED IN THE CITY OF _____, COUNTY OF _____, AND IS OWNED BY _____ (NAME OF OWNER) AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

(DESCRIBE THE PROPERTY UPON WHICH THE IMPROVEMENTS WERE MADE BY USING EITHER A METES AND MOUNDS DESCRIPTION, THE LAND LOT DISTRICT, BLOCK AND LOT NUMBER, OR STREET ADDRESS OF THE PROJECT.)

UPON THE RECEIPT OF THE SUM OF \$ _____, THE MECHANIC AND/OR MATERIALMAN WAIVES AND RELEASES ANY AND ALL LIENS OR CLAIMS OF LIENS IT HAS UPON THE FOREGOING DESCRIBED PROPERTY OR ANY RIGHTS AGAINST ANY LABOR AND/OR MATERIAL BOND THROUGH THE DATE OF _____ (DATE) AND EXCEPTING THOSE RIGHTS AND LIENS THAT THE MECHANIC AND/OR MATERIALMAN MIGHT HAVE IN ANY RETAINED AMOUNTS, ON ACCOUNT OF LABOR OR MATERIALS, OR BOTH, FURNISHED BY THE UNDERSIGNED TO OR ON ACCOUNT OF SAID CONTRACTOR FOR SAID BUILDING OR PREMISES.

GIVEN UNDER HAND AND SEAL THIS _____ DAY OF _____, _____.

(SEAL)

(WITNESS)

(ADDRESS)

NOTICE: WHEN YOU EXECUTE AND SUBMIT THIS DOCUMENT, YOU SHALL BE CONCLUSIVELY DEEMED TO HAVE BEEN PAID IN FULL THE AMOUNT STATED ABOVE, EVEN IF YOU HAVE NOT ACTUALLY RECEIVED SUCH PAYMENT, 60 DAYS AFTER THE DATE STATED ABOVE UNLESS YOU FILE EITHER AN AFFIDAVIT OF NONPAYMENT OR CLAIM OF LIEN PRIOR TO THE EXPIRATION OF SUCH 60 DAY PERIOD. THE FAILURE TO INCLUDE THIS NOTICE LANGUAGE ON THE FACE OF THE FORM SHALL RENDER THE FORM UNENFORCEABLE AND INVALID AS A WAIVER AND RELEASE UNDER O.C.G.A. SECTION 44-14-366.

Contractor Note: GA Lien Law changes became effective March 31, 2009. All lien waiver forms shall comply with Georgia Law, O.C.G.A. Section 44-14-366. The above is a reproduction for content only, the Contractor shall use accurately scaled and formatted documents.

WAIVER AND RELEASE
UPON FINAL PAYMENT

STATE OF GEORGIA

COUNTY OF _____

THE UNDERSIGNED MECHANIC AND/OR MATERIALMAN HAS BEEN EMPLOYED BY

_____ (NAME OF CONTRACTOR) TO FURNISH _____ (DESCRIBE
MATERIALS AND/OR LABOR) FOR THE CONSTRUCTION OF IMPROVEMENTS KNOWN AS _____

(TITLE OF THE PROJECT OR BUILDING) WHICH IS LOCATED IN THE CITY OF _____, COUNTY OF
_____, AND IS OWNED BY _____ (NAME OF OWNER) AND MORE PARTICULARLY

DESCRIBED AS FOLLOWS:

(DESCRIBE THE PROPERTY UPON WHICH THE IMPROVEMENTS WERE MADE BY USING EITHER A METES
AND MOUNDS DESCRIPTION, THE LAND LOT DISTRICT, BLOCK AND LOT NUMBER, OR STREET ADDRESS
OF THE PROJECT.)

UPON THE RECEIPT OF THE SUM OF \$ _____, THE MECHANIC AND/OR MATERIALMAN WAIVES
AND RELEASES ANY AND ALL LIENS OR CLAIMS OF LIENS IT HAS UPON THE FOREGOING DESCRIBED
PROPERTY OR ANY RIGHTS AGAINST ANY LABOR AND/OR MATERIAL BOND THROUGH THE DATE OF
_____ (DATE) AND EXCEPTING THOSE RIGHTS AND LIENS THAT THE MECHANIC AND/OR
MATERIALMAN MIGHT HAVE IN ANY RETAINED AMOUNTS, ON ACCOUNT OF LABOR OR MATERIALS, OR
BOTH, FURNISHED BY THE UNDERSIGNED TO OR ON ACCOUNT OF SAID CONTRACTOR FOR SAID
BUILDING OR PREMISES.

GIVEN UNDER HAND AND SEAL THIS _____ DAY OF _____,

(SEAL)

(WITNESS)

(ADDRESS)

NOTICE: WHEN YOU EXECUTE AND SUBMIT THIS DOCUMENT, YOU SHALL BE CONCLUSIVELY DEEMED
TO HAVE BEEN PAID IN FULL THE AMOUNT STATED ABOVE, EVEN IF YOU HAVE NOT ACTUALLY
RECEIVED SUCH PAYMENT, 60 DAYS AFTER THE DATE STATED ABOVE UNLESS YOU FILE EITHER AN
AFFIDAVIT OF NONPAYMENT OR CLAIM OF LIEN PRIOR TO THE EXPIRATION OF SUCH 60 DAY PERIOD.
THE FAILURE TO INCLUDE THIS NOTICE LANGUAGE ON THE FACE OF THE FORM SHALL RENDER THE
FORM UNENFORCEABLE AND INVALID AS A WAIVER AND RELEASE UNDER O.C.G.A. SECTION 44-14-366.

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PROJECT INSPECTION RESPONSIBILITY MATRIX

INSPECTION RESPONSIBILITIES								
PROJECT:								
		3rd Party	Materials Testing	Roofing Inspectors	County Water & Sewer	Design Engineer	General Contractor	NOTES
Utilities								
Sanitary Sewer								
	Trench bed		X					
	Backfill		X					
	8" and greater pipe installation(EXT.)	X			X			County will TV and pressure test lines
	6" and smaller pipe installation(EXT.)	X						Contractor will TV and pressure test lines
	All pipe under slab to 5' beyond Bldg face	X						Contractor will TV and pressure test lines
	Manholes and structures	X						
	Test manhole	X			X			
Water								
	Trench bed		X					
	Backfill		X					
	Piping from vault to building	X						
	Piping from vault away from building				X			
	Vault & equipment				X		X	
	Back Flow Preventer				X			GCPS to test prior to requesting C.O.
	Water tap				X			
Storm Drainage System								
	Trench bed		X					
	Backfill		X					
	Pipe installation	X						
	Structures	X						
	STRUCTURE GROUTING		X					
Building								
Foundations								
	Subgrade		X					
	Dirf compaction		X					
	Mesh & rebar	X	X					
	Concrete cylinders		X					
Structural Steel								
	Connections		X					
	Camber					X		
	Deck welding/screw pattern		X	X				
Masonry								
	Block		X					
	Mortar strength		X					
	Wall ties		X			X		
	Waterproofing		X			X		
	Thru wall flashing		X			X		
	Rebar		X					
Roof								
	Materials			X				
	Methods			X				
MEP								
	HVAC	X				X		
	Electrical	X				X		
	Plumbing	X				X		
Sitework								
Erosion Control								
	NOI for NPDES					X		GC/GCPS to sign forms before submitting
	Initial Erosion Inspection					X		
	Daily, Weekly Monitoring (ESIM Report)	X						
	Silt fencing	X						
	Check dams	X						
	Inlets	X						
	Preliminary plan	X				X		
	Intermediate plan	X				X		
	Final plan	X				X		
	NPDES report N.O.T.					X		GC/GCPS to sign forms before submitting
Pavement								
	Subgrade compaction		X					
	Stone depth & compaction		X					
	Asphalt - depth, temp., compaction		X					
Earthwork								
	Compaction		X					
	Bad Soil		X					
	Rock		X					
Modular walls								
	Block work						X	
	Compaction						X	
	Tie back fabric						X	
Concrete Walls								
	Foundations	X						
	Reinforcing and Installation	X						
Fire Marshal								
	50% inspection						X	
	80% inspection						X	
	Final inspection						X	
5/13/2010								
NOTES:								
1. Architects and engineers are still responsible for inspecting project during construction to make sure the project work is per the Contract Documents.								
2. General Contractor is responsible for scheduling all inspections and testing before installation or cover up as required in the Contract Documents.								

End of Section 010440

SECTION 010900 - DEFINITIONS AND STANDARDSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF REQUIREMENTS:

General: This section specifies procedural and administrative requirements for compliance with governing regulations and codes and standards imposed upon the Work. These requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes and standards.

The term, "Regulations", is defined to include laws, statutes, ordinances and lawful orders issued by governing authorities, as well as those rules, conventions and agreements within the construction industry which effectively control the performance of the work regardless of whether they are lawfully imposed by governing authority or not.

Governing Regulations: Refer to General and Supplementary Conditions for requirements related to compliance with governing regulations.

DEFINITIONS:

General Explanation: Certain terms used in contract documents are defined in this article. Definitions and explanations contained in this section are not necessarily complete, but are general for the Work to the extent that they are not stated more explicitly in another element of the contract documents.

General Requirements: The provisions or requirements of other Division-1 sections apply to entire work of the Contract and, where so indicated, to other elements which are included in the project.

Indicated: The term "indicated", is a cross-reference to graphic representations, notes or schedules on the drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used in lieu of "indicated", it is for the purpose of helping the reader locate the cross-reference, and no limitation of location is intended except as specifically noted.

Directed, Requested, Etc.: Where not otherwise explained, terms such as "directed", "requested", "authorized", "selected", "approved", "required", "accepted", and "permitted" mean "directed by Architect/Engineer", "requested by Architect/Engineer", and similar phrases. However, no such implied meaning will be interpreted to extend Architect's/Engineer's responsibility into Contractor's area of construction supervision.

Approve: Where used in conjunction with the Architect's/Engineer's response to submittals, requests, applications, inquiries, reports and claims by the Contractor, the meaning of term "approved" will be held to limitations of the Architect's/ Engineer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will the Architect/Engineer's approval be interpreted as a release of the Contractor from responsibilities to fulfill requirements of contract documents or acceptance of the Work, unless otherwise provided by requirements of the contract documents.

Project Site: The term "project site" is means the space available to the Contractor for performance of the Work, either exclusively or in conjunction with others performing other work as part of the project. The extent of the project site is shown on the drawings, and may or may not be identical with the description of the land upon which project is to be built.

Furnish: The term "furnish" is used to mean "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations."

Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations."

Provide: The term "provide" means "to furnish and install, complete and ready for intended use".

Installer: The "installer" is "the entity" (person or firm) engaged by the Contractor, its subcontractor or sub-subcontractor for performance of a particular element of construction at the project site, including installation, erection, application and similar required operations. It is a requirement that installers are experienced in the operations they are engaged to perform.

Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests of the work, either at the project site or elsewhere, and to report, and (if required) interpret results of those inspections or tests.

SPECIFICATION FORMAT AND CONTENT EXPLANATION:

General: This article is provided to help the user of these specification more readily understand the format, language, implied requirements and similar conventions of content. None of the following explanations shall be interpreted to modify the substance of the contract requirements.

Production Methods: Portions of these specifications have been produced by editing master specifications; they may contain minor deviations from traditional writing formats. Such deviations are a natural result of this production technique, and no other meaning shall be implied.

Specification Format: These specifications are organized based upon the Construction Specifications Institute's 16-Division format. The organization of these specifications into Divisions, Sections or Trade Headings conforms generally to recognized industry practice.

Specification Content: This project specification has been produced employing certain conventions in the use of language as well as conventions regarding the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

In certain circumstances, the language of the specifications and other contract documents is of the abbreviated type. Implied words and meaning that will be appropriately interpreted. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where the full context of the contract documents so indicates.

Imperative Language is used generally in the specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, contrasting subjective language is used to describe responsibilities which must be fulfilled indirectly by the Contractor, or by others when so noted.

Methods of Specifying: The techniques or methods of specifying requirements vary throughout the text. The method used for specifying one element of the Work has no bearing on requirements for another element of the Work.

Assignment of Specialists: In certain circumstances, the specification requires or implies that specific elements of the Work are to be assigned to specialists who must be engaged to perform that element of the Work. Such assignments are special requirements over which the Contractor has no choice or option. They are intended to establish which party or entity involved in a specific element of the Work is considered as being sufficiently experienced in the indicated construction processes or operations to be recognized as "expert" in those processes or operations. Nevertheless, the ultimate responsibility for fulfilling all contract requirements remains with the Contractor.

These requirements should not be interpreted to conflict with the enforcement of building codes and similar regulations governing the Work. They are also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

Trades: The use of certain titles such as "carpentry" in the specification, is not intended to imply that the Work must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter". It also is not intended to imply that the requirements specified apply exclusively to tradespersons of that corresponding generic name.

DRAWING SYMBOLS:

General: Except as otherwise indicated, graphic symbols used on the drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., seventh edition.

Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, these symbols are supplemented by more specific symbols as recommended by other technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect/ Engineer for clarification before proceeding.

INDUSTRY STANDARDS:

Applicability of Standards: Except where more explicit or stringent requirements are written into the contract documents, applicable construction industry standards have the same force and effect as if bound into or copied directly into the contract documents. Such industry standards are made a part of the contract documents by reference. Individual specification sections indicate which codes and standards the Contractor must keep available at the project site for reference.

Referenced standards (standards referenced directly in the contract documents) take precedence over non-referenced standards that are recognized in the industry for applicability to the Work.

Un-referenced Standards: Except as otherwise limited by the contract documents, standards not referenced but recognized in the construction industry as having direct applicability will be enforced for performance of the Work. The decision as to whether an industry code or standard is applicable, or as to which of several standards are applicable, is the sole responsibility of the Architect/Engineer.

Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.

Updated Standards: At the request of the Architect/Engineer, Contractor or governing authority, submit a change order proposal where an applicable industry code or standard has been revised and reissued after the date of the contract documents and before the performance of the work affected. The Architect/ Engineer will decide whether to issue the change order to proceed with the updated standard.

Conflicting Requirements: Where compliance with two or more standards is specified, and where these standards establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the contract documents specifically indicate a less stringent requirement. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Architect/Engineer for a decision before proceeding. For bidding purposes, Contractor shall advise Architect of such conflicts in quantity or quality prior to bid or bid the more stringent condition.

Minimum Quantities or Quality Levels: In every instance the quantity or quality level shown or specified is intended to be the minimum for the work to be provided or performed. Unless otherwise indicated, the actual work may either comply exactly, within specified tolerances, with the minimum quantity or quality specified, or may exceed that minimum within reasonable limits. In complying with requirements, the indicated numeric values are either minimum or maximum values, as notes, or as appropriate for the context of the requirements. Refer instances of uncertainty to the Architect/Engineer for decision before proceeding.

Copies of Standards: The contract documents require that each entity performing work be experienced in that part of the work being performed. Each entity is also required to be familiar with industry standards applicable to that part of the work. Copies of applicable standards are not bound with the contract documents.

Where copies of standards are needed for proper performance of the Work, the Contractor is required to obtain such copies directly from the publication source.

Although certain copies of standards needed for enforcement of the requirements may be required submittals, the Architect/ Engineer reserves the right to require the Contractor to submit additional copies of these standards as necessary for enforcement of the requirements.

Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where acronyms or abbreviations are used in the specifications or other contract documents they are defined to mean the recognized name of the trade association, standards generating organization, governing authority or other entity applicable to context of text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

End of Section 010900

SECTION 013100 - SCHEDULESPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

COORDINATION:

Coordinate both the procedural timing and the listing (naming and sequencing) of reports/activities required by provisions of this section and other sections, to afford consistency and logical coordination between submitted reports or lists. Make appropriate distribution of report to entities involved in the work including Architect/Engineer. In particular, provide close coordination of progress schedule, schedule of values, listing of subcontracts, schedule of submittals, progress reports, and payment requests.

PROGRESS AND COORDINATION MEETINGS:

See Section PROCEDURES AND CONTROLS.

PROGRESS SCHEDULE:

Submit for project:

CPM Schedule: Secure critical time commitments for performing major elements of the work. At pre-construction conference, submit a comprehensive CPM type progress schedule indicating a time for each major category or unit of work to be performed at site, and including minor units which are, nevertheless, involved in overall sequencing of the work, meshing of work, and to show how substantial completion is scheduled to allow for Architect's or Engineer's procedure for certification thereto.

Provide scheduled dates for building dry-in, building tight and permanent power.

In addition to the overall CPM schedule, provide separate CPM Schedules for the independent phases of the work reflecting all the specific categories, etc, involved in the particular phases. Also, provide separate CPM schedules for the individual permit areas. Permit areas are indicated on the cover sheet of the drawings.

Also, provide reduced scale copies of the schedule (8-½" x 11" and 11" x 17") for use by the Architect/Owner.

Correlate the critical path to calendar date to be associated with the "cost correlation" noted in the paragraph Cost Correlation below.

Prepare and maintain schedule on sufficiently wide sheet or series of sheets, of stable transparency or other reproducible stock, to show required data clearly for entire Construction Time, and to permit reproduction for required distribution.

Cost Correlation: Provide a cost correlation line ("precalculated" and "actual") to show dollar-volume of work performed as of same dates used for preparation of payment requests. In so far as it is practical to do so, use same units of work in progress schedules as indicated in the "schedule of values" required by General Conditions.

DELAYS AND EXTENSIONS OF TIME (From Supplementary Conditions):

CPM Schedule shall reflect the below weather related delays in the time of completion.

Completion time will not be extended for normal bad weather. The time for completion as stated in the Contract Documents includes due allowance for days on which work cannot be performed out-of-doors. For the purpose of this contract, the Contractor agrees that he may expect to lose working days to weather in accordance with the following table:

January	14	May	6	September	3
February	14	June	4	October	4
March	10	July	4	November	7
April	7	August	4	December	10

If the total accumulated number of working days lost to the weather from the start of work until the building is enclosed exceeds the total accumulated number to be expected for the same period from the table above, time for completion will be extended by the number of calendar days needed to include the excess number of working days lost. No extension will be made for days of bad weather occurring after the building is enclosed. No changes in the contract sum will be authorized because of adjustment of contract time due to weather.

CONTRACTOR NOTE: The Owner will require that the Contractor increase his work effort to achieve a six (6) day, ten (10) hour per day work week upon the determination that the construction progress is two (2) weeks behind the original construction schedule as required by the General Conditions.

Distribution: Following initial submittal to and response by Architect/Engineer, print and distribute demolition and progress schedule to Architect/Engineer (2 copies), Owner, principal subcontractors and suppliers or fabricators, and others with a need-to-know schedule-compliance requirement.

The initial application for payment will not be approved until the demolition, progress schedule, schedule of values and cost correlation have been received and approved by the Architect.

End of Section 013100

SECTION 013110 - SUBMITTALSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF REQUIREMENTS:

The types of submittal requirements specified in this section include shop drawings, product data, samples and miscellaneous work-related submittals. Individual submittal requirements are specified in applicable sections for each unit of work. Refer to other Division-1 sections and other contract documents for requirements of administrative submittals.

Definitions: Work-related submittals of this section are categorized for convenience as follows:

Shop drawings include specially-prepared technical data for this project, including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form for general application to a range of similar projects.

Product data include standard printed information on materials, products and systems; not specially-prepared for this project, other than the designation of selections from among available choices printed therein.

Samples include both fabricated and un-fabricated physical examples of materials, products and units of work; both as complete units and as smaller portions of units of work; either for limited visual inspection or (where indicated) for more detailed testing and analysis.

Miscellaneous submittals related directly to the work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, reports, physical work records, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, overrun stock, and similar information, devices and materials applicable to the work and not processed as shop drawings, product data or samples.

GENERAL SUBMITTAL REQUIREMENTS:SCHEDULE OF VALUES:

Prepare the schedule of values as required by the general and supplementary conditions.

Schedule of values shall show quantities and number of units for all materials.

The initial application for payment will not be approved until the progress schedule and schedule of values have been received and approved by the Architect.

Initial Payment Application: Actions and submittals which must precede submittal of Contractor's first payment application:

Listing of Subcontractors and Principal Suppliers and Fabricators.

Schedule of values.

Cost Correlation (Anticipated billings, month by month)

Progress schedule.

Schedule of submittals.

Listing of Contractor's staff assignments, key personnel and principal consultants.

Final Payment Application: Actions and submittals which must precede or coincide with submittal of contractor final payment application:

Completion of project closeout requirements.

Completion of items specified for completion beyond time of substantial completion.

Completion of incomplete work.

Transmittal of required project construction records to Owner.

Removal of temporary facilities, services, surplus materials, rubbish, and similar elements.

Change over of door locks and other Contractor's access provisions to Owner's property.

RECORD DOCUMENT SUBMITTALS:

Record Drawings: Maintain a record set of blueline prints of contract drawings and shop drawings in a clean, undamaged condition. Mark-up the set of record documents to show the actual installation. When shop drawings are used for mark-up, record a cross reference at the corresponding location on the working drawings. Give particular attention to concealed work that would be difficult to measure and record at a later date.

Mark records sets with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work.

Note related change order numbers where applicable.

Note change order in green erasable pencil.

Record Specifications: Maintain one complete copy of the Project Manual, including specifications and addenda, and one copy of other written construction documents such as change orders and similar modifications issued in printed form during construction. Mark these documents to show substantial variations in the actual work performed.

General Contractor's Close-Out Document Manuals:

Submit three copies

Organize material in heavy duty D-ring, 3-ring vinyl covered binders with clear vinyl covers for identification sheets and pocket folders for folded sheet information. Provide table of contents and index dividers to organize data as directed by the Architect. Organize operation and maintenance data in separate binder in 16 Division format. Mark the appropriate identification on both front and spine of each binder. Size binder(s) as necessary for documentation thickness. Provide approved Close-out manual in electronic form on a CD.

The following types of information shall be included:

Contractors and Subcontractors warranties and affidavits, certificates required of the Contractor, Subcontractor, or Materialmen. Items shall be organized in 16 Division format.

List of subcontractors with addresses, telephone numbers, and contact person.

Copy of the Certificate of Occupancy.

Special warranties or certifications required for specific materials or equipment.

Maintenance Manuals:

Furnish 3 copies of each required manual (Plumbing, Mechanical, Mechanical Controls, Sprinkler, Electrical).

Organize operating and maintenance data into suitable sets of manageable size. Bind data into individual binders properly identified and indexed. Bind each set of data in a heavy-duty D-ring, 3-ring vinyl covered binder with clear vinyl covers for identification sheets and pocket folders for folded sheet information. Mark the appropriate identification on both front and spine of each binder. Size binder(s) as necessary for documentation thickness.

Include the following types of information in operation and maintenance manuals:

Emergency instructions.

Spare parts listing.

Copies of warranties.

Wiring diagrams.

Recommended "turn-around" cycle.

Scheduling: Where appropriate in administrative submittals (listing of products, manufacturers, suppliers and subcontractors, and in job progress schedule), show principal work-related submittals and time schedules for coordination of submittal activity with related work in each instance.

Listing: Prepare a separate listing, organized by related specification section number sequence, showing principal work-related submittals and their initial submittal dates as required for coordination of the work. Submit listing within 45 days of date of commencement of the work. Listing shall be updated weekly throughout project to reflect activity and reorganization as necessary. Provide monthly update for Architect and Owner.

Coordination and Sequencing: Coordinate preparation and processing of submittals with performance of the work so that work will not be delayed by submittals. Coordinate and sequence different categories of submittals for same work, and for interfacing units of work, so that one will not be delayed for coordination of A/E's review with another.

Preparation of Submittals: Provide permanent marking on each submittal to identify project, date, Contractor, subcontractor, submittal name and similar information to distinguish it from other submittals. Show Contractor's executed review and approval marking and provide space for Architect's/Engineer's "Action" marking. Package each submittal appropriately for transmittal and handling. Submittals which are received from sources other than through Contractor's office will be returned by A/E "without action".

Transmittal Form: Equal to AIA Form G810.

SPECIFIC-CATEGORY SUBMITTAL REQUIREMENTS:

General: Except as otherwise indicated in individual work sections, comply with requirements specified herein for each indicated category of submittal. Provide and process intermediate submittals, where required between initial and final, similar to initial submittals.

Shop Drawings: Provide newly-prepared information, with graphic information at accurate scale (except as otherwise indicated), with name of preparer indicated (firm name). Show dimensions and note which are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards, and special coordination requirements. Do not allow shop drawing copies without appropriate final "Action" markings by Architect/Engineer to be used in connection with the work.

Submittal: Unless otherwise specified, the number of shop drawings and the number of samples which the Contractor shall submit and, if necessary, resubmit, is the number that the Contractor requires to be returned plus three (3) copies which will be retained by the Architect. All Structural, Door, Aluminum Storefront and Finish Hardware shall be submitted in hard copy and electronic format. For all HVAC submittals, the contractor shall submit the number of copies the contractor requires to be returned plus five (5) copies which will be retained by the Architect. Electronic copies of the HVAC submittals shall be submitted initially. After review the five (5) hard copies shall be submitted with necessary corrections for Owner use.

NOTE: All shop drawings shall be provided in electronic format (.pdf). Contractor shall provide hard copies of any requested by the Arcitect or Owner.

The Owner shall be included on distribution for all final APPROVED or APPROVED AS NOTED shop drawings, brochures, catalog cuts, etc. The Architect will provide to the Owner one copy each, during the course of construction as they are approved.

Product Data: Collect required data into one submittal for each unit of work or system; and mark each copy to show which choices and options are applicable to project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked, and special coordination requirements. Maintain one set of product data (for each submittal) at project site, available for reference by Architect/Engineer and others. Where multiple products or options appear in the submittal, clearly indicate items/options to be provided. Failure to fully annotate the submittal will be cause for rejection.

Submittals: Do not submit product data, or allow its use on the project, until compliance with requirements of contract documents has been confirmed by Contractor. Submittal is for information and record, unless otherwise indicated.

Installer's Copy: Do not proceed with installation of materials, products or systems until final approved copy of applicable product data is in possession of Installer.

Samples: Provide units identical with final condition of proposed materials or products for the work. Include "range" samples (not less than 3 units) where unavoidable variations must be expected, and describe or identify variations between units of each set. Provide full set of optional samples where Architect's/Engineer's selection is required. Prepare samples to match Architect's/Engineer's sample where so indicated. Include information with each sample to show generic description, source or product name and manufacturer, limitations, and compliance with standards. Samples are submitted for review and confirmation of color, pattern, texture and "kind" by Architect/Engineer. Architect/Engineer will not "test" samples (except as otherwise indicated) for compliance with other requirements, which are therefore the exclusive responsibility of Contractor.

Inspection and Test Reports: Classify each as either "shop drawing" or "product data", depending upon whether report is uniquely prepared for project or a standard publication of workmanship control testing at point of production, and process accordingly.

Warranties: Refer to "Products" section for specific general requirements on warranties, product/workmanship bonds, and maintenance agreements. In addition to copies desired for Contractor's use, furnish 2 executed copies, except furnish 2 additional (conformed) copies where required for maintenance manuals.

Closeout Submittals: Refer to individual work sections and to "closeout" sections for specific requirements on submittal of closeout information, materials, "record drawings", tools and similar items.

Materials and Tools: Refer to individual work sections for required quantities of spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.

General Distribution: Provide additional distribution of submittals (not included in foregoing copy submittal requirements) to subcontractors, suppliers, fabricators, installers, governing authorities and others as necessary for proper performance of the work. Include such additional copies in transmittal to Architect/Engineer where required to receive "Action" marking before final distribution. Record distributions on transmittal forms.

ACTION ON SUBMITTALS:

Architect's/Engineer's Action: Where action and return is required or requested, Architect/Engineer will review each submittal, mark with "Action", and where possible return within 2 weeks of receipt. Where submittal must be held for coordination, Contractor will be so advised by A/E without delay.

Action Stamp: Architect's/Engineer's action stamp, for use on submittals to be returned to Contractor, is self-explanatory as marked.

CADD (Computer Aided Design & Drafting) Information:

If the Contractor or a Subcontractor wishes to obtain a CADD version of a contract document to assist in preparation of shop drawings, the information will be made available, subject to the following restrictions and limitations:

The Contractor or Subcontractor shall agree to the terms and conditions set forth in a release Agreement provided by the Architect.

Note: CADD documents will not be released to bidding entities prior to bid.

End of Section 013110

SECTION 015000 - TEMPORARY FACILITIESPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to the work of this section.

DESCRIPTION OF REQUIREMENTS:

This section specifies administrative and procedural requirements for temporary services and facilities, including such items as temporary utility services, temporary construction and support facilities, and project security and protection.

Existing Operations: It is understood and agreed that the Owner is now occupying and conducting his business in adjacent existing buildings and will continue to do so during the progress of the work. The Contractor shall keep the passages of these building open and free from obstructions at all times for the use of the Owner and shall provide ample protection for the public against the elements and possible harm or injury from any operations of the building work during the entire period of work. Material storage areas and Contractor's operations shall be kept clear of all Owner activities and confined to designated areas. Protect all existing work from damage by construction operation. All ingress for materials and excavation route for debris shall be as approved by the Owner.

Access to the site is limited. The Contractor shall not endanger or interfere with pedestrian or vehicular traffic in any way.

All work shall be scheduled so as to not interrupt normal school activities. The contractor shall coordinate his work so as not to interfere with special school functions after normal working or school hours. Drives, parking areas and walks shall be maintained at all times.

Where work of any nature is done in the existing building, protect existing finishes to remain by whatever means necessary. Replace at the Contractor's expense if damaged.

Security Requirements: All employees of the Contractor shall be required to wear an identification badge for work on existing school campuses and occupied schools. These badges will be issued without cost to the Contractor, however, the Contractor will be responsible for returning all badges to the Owner at the completion of the Contract. All badges must be returned.

Use Charges: No cost or usage charges for temporary services or facilities are chargeable to the Owner or Architect/Engineer. Cost or use charges for temporary services or facilities will not be accepted as a basis of claims for a change-order extra.

Temporary utility services required for use at the project site include but are not limited to the following:

- Water service and distribution.
- Temporary electric power and light.
- Telephone service.
- Provide adequate utility capacity at each stage of construction.
- Sanitary facilities, including drinking water.
- Storm and sanitary sewer.

Note: To the extent the Owner's existing house service panel has sufficient capacity, the Contractor may utilize the Owner's electrical service. Do not overload circuits or cause disruption of Owner's power. Coordinate through the Owner's Project Representative and Maintenance staff.

Temporary construction and support facilities required for the project include but are not limited to the following:

- Temporary roads and paving.
- Hoists and temporary elevator use.
- Temporary project identification signs and bulletin boards.
- Rodent and pest control.
- Temporary heat.
- Field offices and storage sheds.
- Sanitary facilities, including drinking water.
- De-watering facilities and drains.
- Temporary enclosures.
- Waste disposal services.
- Construction aids and miscellaneous general services and facilities.
- Alternate temporary services and facilities, equivalent to those specified, may be used, subject to acceptance by the Architect/Engineer.

Security and protection facilities and services required for the project include but are not limited to the following:

- Temporary fire protection.
- Barricades, warning signs, and lights.
- Enclosure fence for the site.
- Environmental protection.

SUBMITTALS:

Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

Implementation and Termination Schedule: Within 15 days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.

QUALITY ASSURANCE:

Regulations: Comply with requirements of local laws and regulations governing construction and local industry standards, in the installation and maintenance of temporary services and facilities, including but not limited to the following:

- Building Codes, including local requirements for permits, testing and inspection.
- Health and safety regulations.
- Utility company regulations and recommendations governing temporary utility services.
- Police and Fire Department rules and recommendations.
- Police and Rescue Squad recommendations.
- Environmental protection regulations governing use of water and energy, and the control of dust, noise and other nuisances.

Standards: Comply with the requirements of NFPA Code 241, "Building Construction and Demolition Operations", the ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and the NECA National Joint Guideline NJG-6 "Temporary Job Utilities and Services".

Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", as prepared jointly by AGC and ASC for industry recommendations.

Inspections: Inspect and test each service before placing temporary utilities in use. Arrange for required inspections and tests by governing authorities, and obtain required certifications and permits for use.

JOB CONDITIONS:

General: Provide each temporary service and facility ready for use at each location when the service or facility is first needed to avoid delay in performance of the work. Maintain, expand as required and modify temporary services and facilities as needed throughout the progress of the Work. Do not remove until services or facilities are no longer needed, or are replaced by the authorized use of completed permanent facilities.

Conditions of Use: Operate temporary services and facilities in a safe and efficient manner. Do not overload temporary services or facilities, and do not permit them to interfere with the progress of the work. Do not allow unsanitary conditions, public nuisances or hazardous conditions to develop or persist on the site.

WHERE THE OWNER ALLOWS USE OF EXISTING OWNER WATER AND ELECTRICAL SERVICES, DO NOT ABUSE USE OF EXISTING UTILITIES. DO NOT DISTURB OR INTERRUPT OWNER OPERATIONS WITH OVERLOADS ON EXISTING UTILITIES. COORDINATE SOURCE OF TEMPORARY POWER FROM OWNER EQUIPMENT WITH OWNER REPRESENTATIVE PRIOR TO ACTUAL CONNECTION.

PART 2 - PRODUCTSMATERIALS AND EQUIPMENT:

General: Provide new materials and equipment for temporary services and facilities; used materials and equipment that are undamaged and in serviceable condition may be used, if acceptable to the Architect/Engineer. Provide only materials and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards.

Temporary Utilities: Where the local utility company provides only a portion of the temporary utility, provide the remainder with matching, compatible materials and equipment. Comply with the utility company's recommendations.

Electrical Service: Comply with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service, including those requirements included in Division-16 sections.

Voltage Differences: Provide identification warning signs at power outlets which are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets.

Ground-Fault Protection: Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, for plug-in connection of power tools and equipment.

Electrical Power Cords: Use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.

Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Protect lamps with guard cages or tempered glass enclosures, where fixtures are exposed to breakage by construction operations. Provide exterior fixtures where fixtures are exposed to the weather or moisture.

Temporary Construction and Support Facilities: Provide facilities that can be maintained properly throughout their use at the project site.

Temporary Offices and Similar Construction: For temporary offices, fabrication shops, storage sheds and similar construction, provide either standard prefabricated or mobile units or the equivalent job-built construction.

Self-Contained Toilet Units: Provide single-occupant self-contained toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar non-absorbent material.

Drinking Water: Provide potable water approved by local health authorities. Where well water must be used, comply with local health authorities recommendations for type and frequency of testing water for potability.

Fire Extinguishers: Provide type "A" fire extinguishers for temporary offices and similar spaces where there is minimal danger of electrical or grease-oil-flammable liquid fires. In other locations provide type "ABC" dry chemical extinguishers, or a combination of several extinguishers of NFPA recommended types for the exposures in each case.

PROTECTION OF LIFE AND PROPERTY:

FIRST AID:

The Contractor shall agree that work will be completed with the greatest degree of safety and to conform to the provisions of the Manual of Accident Prevention in Construction published by the Associated General Contractors of America, latest edition. Articles necessary for giving "first aid" shall be maintained in the Contractor's field office at the site. There shall be standing arrangements for immediate removal and hospital treatment of any employee injured or who may become ill and require such treatment.

OSHA Standards: Contractor's attention is directed to safety, health, first aid and medical provisions of the Occupational Safety and Health Standards, Federal Register Vol. 37/No. 202, Part II and Safety and Health Regulations for Construction, Federal Register Vol. 37/No.243, Part II for conformance in areas of the work, implementing Occupational Safety and Health Act of 1970.

PART 3 - EXECUTION

INSTALLATION, GENERAL:

General: Use qualified tradesmen for installation of temporary services and facilities. Locate temporary services and facilities where they will serve the entire project adequately and result in minimum interference with the performance of the Work.

Relocate, modify and extend services and facilities as required during the course of work so as to accommodate the entire work of the project.

TEMPORARY UTILITY INSTALLATION:

General: Engage the local utility companies to install temporary services to the project.

Water Service:

General: Provide temporary water service. Install water service and distribution piping of sizes and pressures adequate for construction purposes during the construction period and until permanent service is in use, including but not limited to the following uses:

- Tire Wash at Construction Entrance
- Construction processes.
- Fire protection.
- Drinking water.
- Sanitary facilities.
- Cleaning.

Temporary Electric Power Service:

General: Provide a weatherproof, grounded temporary electric power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of work during the construction period. Whenever an overhead floor or roof deck has been installed, install temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every area of work.

Temporary Service: Install service and grounding in compliance with the National Electric Code (NFPA 70). Include necessary meters, transformers, overload protected disconnect and main distribution switch gear.

Temporary Lighting:

Provide local switching of temporary lighting, spaced to allow lighting to be turned off in patterns to conserve energy and retain light suitable for access traffic, security check and project lock-up.

Install and operate temporary lighting that will fulfill security and protection requirements, without the necessity of operating the entire temporary lighting system.

The Contractor shall provide and maintain temporary lighting through out the structure in order to achieve a minimum 10 fc of lighting at all task levels where construction trades are performing a construction task or service under the work. The minimum 10 fc lighting level at all task levels shall be available for routine Owner's and Project Architect/Engineer observation of the work during the construction phase of the project. Light shall be incandescent halide type. (No fluorescent lighting will be permitted.)

Additional lighting shall be provided as may be required for code and TASK purposes.

Temporary Exterior Lighting: Install exterior yard lights for security and illumination.

Temporary Telephones:

General: Arrange for the local telephone company to install temporary service to the project.

Sewers and Drainage:

General: If existing sewers are available for temporary drainage near the site prior to completion of permanent sewers, provide temporary connections to remove effluent that can be lawfully discharged into the sewers. If existing sewers cannot be used for discharge, provide drainage ditches, dry wells, waste stabilization ponds and similar discharge facilities to remove effluent that can be lawfully discharged in that manner. If neither existing sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off the site in a lawful manner.

Before discharge of liquid wastes into sewers or drainage facilities, filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways. Provide temporary filter beds, settlement tanks, separators and similar devices to purify effluent to acceptable levels.

Connect temporary sewers to the municipal sewer systems in the manner directed by the sewer department officials.

Maintain temporary sewers and drainage facilities in a clean, sanitary condition, ready for maximum use. Following heavy usage, restore normal conditions promptly. Provide and maintain temporary earthen embankments and similar barriers in and around construction excavations and subgrade construction, sufficient to prevent flooding of the work by runoff of storm water from heavy rain storms.

TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION:

General: Provide a reasonably neat and uniform appearance in temporary construction and support facilities acceptable to the Architect/Engineer and the Owner.

Locate field offices, storage and fabrication sheds and other support facilities for easy access to the Work. Position offices so that windows give the best possible view of construction activities.

Except as otherwise indicated, make the change-over from use of temporary services and facilities to use of permanent services and facilities at the earliest feasible date at each portion of the building, to minimize hazards and interferences with performance of the Work.

Maintain field offices, storage and fabrication sheds, temporary sanitary facilities, waste collection and disposal systems, and project identification and temporary signs until near substantial completion. Immediately prior to substantial completion remove these facilities. Personnel remaining at the site beyond substantial completion will be permitted to use certain permanent facilities, under restricted use conditions acceptable to the Owner.

Temporary Heat:

General: Provide temporary heat for performance of the Work, curing or drying of recently installed work or protection of work in place from adverse effects of low temperatures or high humidity. Select facilities known to be safe and without deleterious effect upon the work in place or being installed. Coordinate with ventilation requirements to produce the indicated ambient condition required and to minimize the consumption of fuel or energy.

Maintain a minimum temperature of 50 deg. F in permanently enclosed portions of the building and areas where finished work has been installed.

Heating Facilities: Except where conditions make it necessary to use another system, and where use of the permanent heating system is available and authorized, provide properly vented self-contained LP gas or fuel oil heaters with individual space thermostatic control for temporary heat.

Limit use of gasoline-burning space heaters to the indirect-fired type, located outside the building space or space being heated. Use gasoline-burning space heaters only where the specified system for temporary heating cannot be used.

Do not use open burning or salamander type heating units.

Field Offices: Provide temporary field offices of sufficient size to accommodate required office personnel.

Equipment and Work Area: An area with stone or paved all weather surface, adequate for job parking of autos, trucks and equipment and storage of materials shall be provided within a construction fenced enclosure.

Temporary Paving: Construct and maintain temporary roads and paving to support the indicated loading adequately and to withstand exposure to traffic during the construction period. Locate temporary paving for roads, storage areas, and parking where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Architect. Provide stone access to building area. Do not allow equipment to rut and damage grades at building which have been softened by inclement weather. Remove stone when construction is complete. The use of rubber tired, multi-directional steering lifts (Lulls) are prohibited on this project except when used on stone or paved roadways capable of supporting their weight and movement without rutting. Damage to grades, paving or other surfaces resulting from the use of lulls can result in such equipment being banned from the site.

Paving: Comply with Division 2 Section "Asphalt Paving" for construction and maintenance of temporary paving.

Coordinate temporary paving development with subgrade grading, compaction, installation and stabilization of subbase, and installation of base and finish courses of permanent paving.

Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas without damage or deterioration when occupied by the Owner.

Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.

Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration, and supervision.

Construction Fencing:

Construction fencing shall be provided wherever necessary to enclose the work areas, storage areas, contractor and his employee parking, etc. Fencing shall be provided to meet the following minimum standards.

Fencing fabric shall be 12.5 gauge wire, 6 inch spacing between stays (vertical wires), minimum 47 inches in height and Type 1 galvanized coating.

Studded "T" posts shall be of high strength steel and a minimum of 6'-0" in height and a maximum spacing of 8'-0" on center.

Where necessary, Contractor shall provide temporary fencing with base supports that allow fencing to be relocated as needed to provide work space or be moved close to the work area for Owner convenience. Such fencing shall not damage concrete or asphalt it is erected over.

Contractor shall provide fencing and gates as necessary to limit access to site when Contractor is not on site.

Contractor shall have the option to install fencing that provides greater security for the construction site, at no additional cost to Owner.

Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

Elevator Installation: Contractor shall coordinate the requirements of the elevator installer and provide any hoist beam design and/or beams necessary for the proper installation of the elevator.

Sanitary Facilities:

General: Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with governing regulations including safety and health codes for the type, number, location, operation and maintenance of fixtures and facilities; provide not less than specified requirements. Install in locations that will best serve the project's needs.

Toilets: Install self-contained toilet units or water and sewer connected temporary toilet facilities, to the extent permitted by governing regulations. Use of pit-type privies will not be permitted.

Drinking Water Fixtures: Provide drinking water fountains where and when piped potable water is reasonably accessible from permanent or temporary lines. Otherwise, provide containerized tap-dispenser bottled-water type drinking water units, including the paper supply.

Dewatering Facilities and Drains:

General: For temporary drainage and dewatering facilities and operations not directly associated with performance of work included under individual work sections, comply with dewatering requirements of applicable Division-2 sections. Where feasible, utilize the same facilities. Maintain the site, excavations and construction free of water.

Dispose of rainwater in a lawful manner which will not result in flooding the project or adjoining property, nor endanger either permanent work or temporary facilities.

Provide temporary drainage where the roofing or similar waterproof deck construction is completed prior to the connection and operation of the permanent drainage piping system, provide temporary drainage.

Temporary Enclosures:

General: At the earliest practical time provide temporary enclosure of materials, equipment, work in progress and completed portions of the Work to provide protection to the Work and employees from effects of exposure, cold, windy, foul or rainy weather, other construction operations, and similar activities on the site.

Provide temporary enclosures where temporary heat is needed and the permanent building enclosure is not yet completed, and there is no other adequate provision for containment of temporary heat. Coordinate enclosures with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

Temporary enclosures shall be constructed so that work can continue on interior of building areas at all times. Collect roof drainage as soon as roof membrane is in place and prevent rainwater from affecting operations within the covered portions of the building.

Protect interior of existing building at tie-in locations from rain or other inclement weather. Do not allow intrusion of moisture into existing wall cavity at tie-ins.

Collection and Disposal of Wastes:

General: Establish a system for daily collection and disposal of waste materials from construction areas and elsewhere on the site. Enforce requirements strictly. Do not hold collected materials at the site longer than 7 days during normal weather or 3 days when the daily temperature is expected to rise above 80 deg. F (27 deg. C). Handle waste materials that are hazardous, dangerous, or unsanitary separately from other inert waste by containerizing appropriately. Dispose of waste material in a lawful manner.

Burying or burning of waste materials on the site will not be permitted.

Washing waste materials down sewers or into waterways will not be permitted.

Contractor shall establish eating areas with refuse containers and enforce their use. No food shall be allowed in the building addition area proper or in the existing building.

Contractor shall collect and dispose of trash and debris daily from the building and site area. Contractor shall not allow trash and debris to litter school grounds.

Rodent and Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and control procedures at regular intervals so the Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished, permanent stairs with a protective covering of plywood or similar material so finishes will be undamaged at the time of acceptance.

Construction Aids and Miscellaneous Services and Facilities:

General: Design, construct, and maintain construction aids and miscellaneous general services and facilities as needed to accommodate performance of the work. Construction aids and miscellaneous general services and facilities include, but are not limited to the following:

- Temporary stairs and ladders.
- Guardrails and barriers.
- Walkways.
- Scaffolding, staging, and Safety Devices

Provide, erect, maintain, and remove them when directed, all scaffolding, staging, platforms, temporary runways, temporary flooring, guards, railings, stairs, etc., as required by local and state codes, or laws, or these Specifications, for the protection of workmen and the public. The construction, inspection, and maintenance of the above items shall comply with all safety codes and regulations applicable to the project.

PROTECTION FACILITIES INSTALLATION:

Temporary Fire Protection:

General: Until fire protection needs may be fulfilled by permanent facilities, install and maintain temporary fire protection facilities of the types needed to adequately protect against reasonably predictable and controllable fire losses. Comply with the applicable recommendations of NFPA Standard 10 "Standard for Portable Fire Extinguishers". Locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher on each floor at or near each usable stairwell. Store combustible materials in containers in recognized fire-safe locations.

Develop and supervise an overall fire prevention and first-aid fire protection program for personnel at the project site. Review needs with the local fire department officials and establish procedures to be followed. Instruct personnel in methods and procedures to be followed. Post warnings and information and enforce strict discipline. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of ignition for possible fires.

Where temporary water outlets are available, provide hoses of sufficient length to reach construction areas. Hang hoses with a warning sign, to the effect that hoses are for fire protection purposes and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

Welding: Welding and cutting of material shall be shielded to protect workmen in the area; contractor shall be extremely cautious when using torches, or similar equipment to guard against danger of fire resulting from such work.

Permanent Fire Protection: At the earliest feasible date in each area of the project, complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel at the site on how to use facilities which may not be self-explanatory.

Barricades, Warning Signs and Lights:

General: Comply with recognized standards and code requirements for the erection of substantial, structurally adequate barricades where needed to prevent accidents and losses. Paint with appropriate colors, graphics and warning signs to inform personnel at the site and the public, of the hazard being protected against. Provide lighting where appropriate and needed, including flashing red lights where appropriate.

Environmental Protection:

General: Provide general protection facilities, operate temporary facilities, conduct construction activities, and enforce strict discipline for personnel on the site in ways and by methods that comply with environmental regulations, and that minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result from the performance of work at the site. Avoid the use of tools and equipment which produce harmful noise. Restrict the use of noise making tools and equipment to hours of use that will minimize noise complaints from persons or firms near the project site.

Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

TEMPORARY CONTROLS:NOISE CONTROL:

Contractor shall effect a satisfactory noise abatement program during construction hours, shall be familiar with and comply with local noise and work hour ordinances.

DUST CONTROL:

Where cutting or removing materials which will generate dust and dirt, the Contractor shall provide temporary dust curtains, solid barricades, or the like, to retain and control dust relative to the area in which work is occurring. Clean areas of dust as soon as practicable so as not to allow its spread by pedestrian traffic, etc.

TEMPORARY PARTITIONS:

The Contractor shall be responsible for locating and constructing temporary partitions as necessary to protect and separate existing and completed spaces from continuing new construction at all times. PARTITIONS SHALL BE CONSTRUCTED OF FIRE PROOF MATERIALS AND SHALL BE DUST AND WEATHER TIGHT.

At traffic areas, the first eight feet from floor shall be fire rated plywood and fire rated gypsum board above the plywood. Install gypsum board and plywood on both sides of wall.

Partitions shall be from floor to roof/ceilings. Paint occupied side of partitions to match adjacent walls. Relocate any lighting necessary on occupied side of the wall to provide consistent corridor or space lighting for Owner's continuing operations.

WEATHER PROTECTION:

Where building roof deck is on, Contractor shall provide weather protection to interior by installing roofing promptly and collecting water as necessary to keep interior dry. This includes protection at openings in vertical face of building. Portions of the existing facility will be active adjacent to temporary partitions exposed to the exterior. Do not allow water intrusion or air leakage. Insulate temporary partitions separating interior and exterior spaces.

OPERATION, TERMINATION AND REMOVAL:

Supervision: Enforce strict discipline in use of temporary services and facilities at the site. Limit availability of temporary services and facilities to essential and intended uses to minimize waste and abuse. Do not permit temporary installations to be abused or endangered. Do not allow hazardous, dangerous or unsanitary conditions to develop or persist on the project site.

Maintenance: Operate and maintain temporary services and facilities in good operating condition throughout the time of use and until removal is authorized. Protect from damage by freezing temperatures and similar elements.

Maintain the operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve indicated results in the Work and to avoid the possibility of damage to the Work or to temporary facilities.

Protection: Prevent water filled piping from freezing, by use of ground covers, insulation, by keeping drained or by temporary heating. Maintain distinct markers for underground lines. Protect from damage during excavation operations.

Termination and Removal: Unless the Architect/Engineer requests that it be maintained for a longer period of time, remove each temporary service and facility promptly when the need for it or a substantial portion of it has ended, or when it has been replaced by the authorized use of a permanent facility, or no later than substantial completion. Complete, or, if necessary, restore permanent work which may have been delayed because of interference with the temporary service or facility. Repair damaged work, clean exposed surfaces and replace work which cannot be satisfactorily repaired.

Materials and facilities that constitute temporary services and facilities are and remain the property of the Contractor.

PROJECT SIGN:

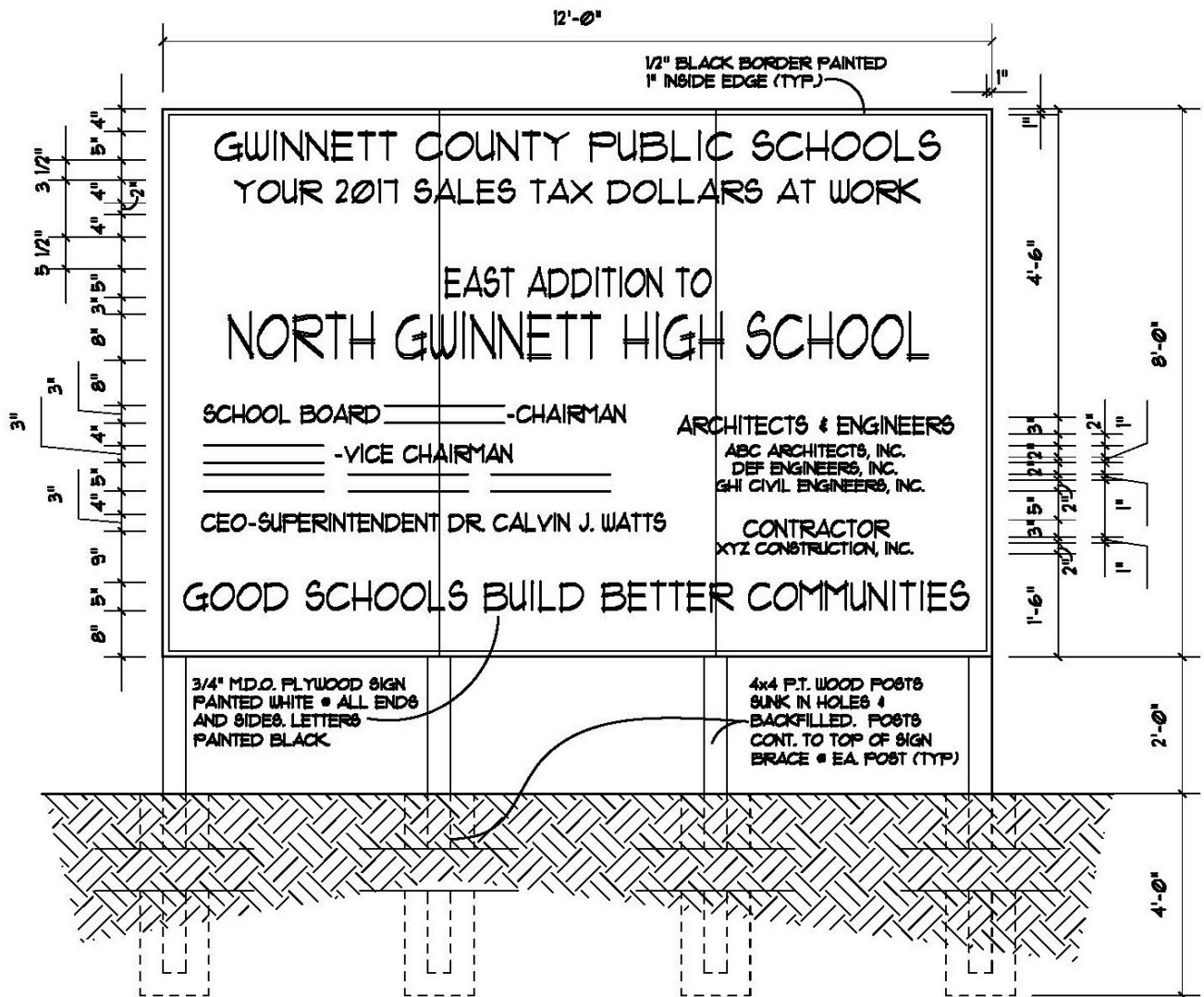
Project sign shall be included in the contract in accordance with the layout shown on the following page.

Signs shall be painted with a minimum of two coats of exterior paint. Contractor shall employ professional sign painter to paint all lettering. Contractor may use vinyl, heat-applied lettering in lieu of painted letters.

This sign shall be the only free standing sign permitted on the project site.

All wording shall be verified through shop drawings with the Architect and Owner prior to fabrication and installation on project site.

(SEE SIGN NEXT PAGE.)



CONTRACTOR VERIFY ALL INFORMATION ON SIGN PRIOR TO CONSTRUCTING
NO LOGOS PERMITTED

End of Section 015000

SECTION 016310 - SUBSTITUTIONSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

SUBSTITUTIONS FOR SPECIFIED MATERIALS OR EQUIPMENT:

When references are made in the specifications to trade names, or to the names of manufacturers, such references are made solely to designate and identify the quality of the equipment or material to be furnished, and are not intended to restrict competitive bidding. In case the Contractor wishes to use material and equipment other than those specified, PRIOR WRITTEN APPROVAL of the Architect must be obtained.

If it is desired to use equipment or materials of different manufacture or trade names from those specified, application for approval of such equipment or materials must reach the hands of the Architect at least ten (10) days prior to the date set for the opening of bids. Application for approval must be accompanied by supporting data clearly proving equality of the proposed substitute to that specified. To be acceptable, a substitute must be equal, or exceed, all requirements of the base specifications, including space limitations. A comparative data schedule shall accompany the submittal. Any changes in the work which might be required to accommodate the proposed substitute shall be clearly shown and described. Should the proposed substitute be approved, any such changes required in other work due to the use of the substitute shall be coordinated and accomplished by the Contractor as part of the Contract at no additional cost to the Owner.

Approval of substitutes will be made by written addendum, issued to all prospective bidders, and mailed from the Architect's office seven (7) days prior to the date set for the opening of bids.

No consideration can be given to requests for approval received later than ten (10) days prior to the date set for opening of bids.

Failure of a proposed product substitution to appear in a written addendum shall mean that the Architect has NOT APPROVED that substitution and that specific substitution may not be incorporated into the project.

End of Section 016310

SECTION 017000 - PROJECT CLOSEOUTPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions apply to work of this section.

DESCRIPTION OF REQUIREMENTS:

Definitions: Closeout is hereby defined to include general requirements near end of Contract Time, in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified in sections of Division 2 through 16.

PREREQUISITES TO COMPLETION:

General: Prior to requesting Architect's inspection for certification of completion (for either entire work or portions thereof), complete the following and list known exceptions in request:

Advise Owner of pending insurance change-over requirements.

Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.

Obtain and submit releases enabling Owner's full and unrestricted use of the work and access to services and utilities, including (where required) occupancy permits, operating certificates, and similar releases.

Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner.

Make final change-over of locks and transmit keys to Owner, and advise Owner's personnel of change-over in security provisions.

Complete start-up testing of systems, and instructions of Owner's operating/maintenance personnel. Contractor shall advise Owner of all required Factory start-ups and coordinate Owner's presence for each. Discontinue (or change over) and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar elements.

Complete final cleaning up requirements, including touch-up painting of marred surfaces.

Touch-up and otherwise repair and restore marred exposed finishes.

Inspection Procedures: Contractor shall inspect the work as areas are completed, coordinate correction of deficiencies, then request Architect's inspection. Upon receipt of Contractor's request, Architect will either proceed with inspection or advise Contractor of prerequisites not fulfilled. Following initial inspection, Architect will either prepare certificate of completion, or advise Contractor of work which must be performed prior to issuance of certificate; and repeat inspection when requested and assured that work has been completed.

PREREQUISITES TO FINAL ACCEPTANCE:

General: Prior to requesting Architect's inspection for certification of acceptance and final payment, as required by General Conditions, complete the following and list known exceptions (if any) in request:

Submit the original Fire Marshal's occupancy permit to:

Marty Hollis, Director of Construction
(or his designated representative)
Gwinnett County Board of Education
53 Gwinnett Drive, Building C
Lawrenceville, Georgia 30046
Telephone: 770 - 513-6600

Building inspection department's original occupancy permit shall be sent to:

Marty Hollis, Director of Construction
(or his designated representative)
Gwinnett County Board of Education
53 Gwinnett Drive, Building C
Lawrenceville, Georgia 30046
Telephone: 770 - 513-6600

Certificate which warrants that all materials, products and assemblies incorporated in this project are totally free of asbestos, PCB, or other such hazardous material.

Owner after completion of project may elect and pay to use services of an independent testing agency to test for asbestos content and pay for subsequent retesting.

If asbestos materials are found to exist in work performed by the Contractor for this project, the Contractor shall pay for the testing above and shall replace the asbestos containing material at no cost to the Owner.

Submit final payment request with original copies of final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

Submit updated final statement, accounting for additional (final) changes to Contract Sum.

Submit copy of Contractor's Punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by the Contractor.

Submit copy of Architect's/Engineer's final punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by Architect/Engineer.

Submit final meter readings for utilities and similar data as of time of substantial completion or when Owner took possession of and responsibility for corresponding elements of work.

Submit consent of surety.

Revise and submit evidence of final, continuing insurance coverage complying with insurance requirements.

Submit Statutory Affidavit and Non-Influence Affidavit.

Submit Statutory Affidavit from each subcontractor or material supplier indicating amount owed to that subcontractor or material supplier, i.e., retainage or retainage plus other amounts. General Contractor shall initial outstanding amounts, indicating his agreement that the amount agrees with his records.

Turn over to the Architect the Record Set of drawings.

Submit Hardware Manufacturer's representative certificate of compliance.

A copy of the erosion control plan, updated by the General Contractor depicting any corrections or modifications to the erosion control plan during the course of the work, to be turned over to the Owner at Project close-out.

Reinspection Procedure: Upon receipt of Contractor's notice that the work has been completed, including punch list items resulting from earlier inspections, and excepting incomplete items delayed because of acceptable circumstances, Architect will reinspect the work. Upon completion of reinspection, Architect will either prepare certificate of final acceptance or advise Contractor of work not completed or obligation not fulfilled as required for final acceptance. If necessary procedure will be repeated.

As-Built Survey:

See Section 010440 Procedures and Controls for requirements.

Record Drawings: Maintain a record set of blue-line prints of contract drawings and shop drawings in a clean, undamaged condition. Mark-up the set of record documents to show the actual installation. When shop drawings are used for mark-up, record a cross reference at the corresponding location on the working drawings. Give particular attention to concealed work that would be difficult to measure and record at a later date.

Mark records sets with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work.

Note related change order numbers where applicable.

Note change order in green erasable pencil.

Record Specifications: Maintain one complete copy of the Project Manual, including specifications and addenda, and one copy of other written construction documents such as change orders and similar modifications issued in printed form during construction. Mark these documents to show substantial variations in the actual work performed.

General Contractor's Close-Out Document Manuals:

Submit three copies along with one CD in each manual containing the entire contents of the manual.

Organize material in heavy duty D-ring, 3-ring vinyl covered binders with clear vinyl covers for identification sheets and pocket folders for folded sheet information. Provide table of contents and index dividers to organize data as directed by the Architect. Organize operation and maintenance data in separate binder in 16 Division format. Mark the appropriate identification on both front and spine of each binder. Size binder(s) as necessary for documentation thickness. Coordinate format of manual with Architect prior to assembly.

The following types of information shall be included:

Contractors and subcontractors warranties and affidavits, certificates required of the contractor, subcontractor, or material men.

List of subcontractors with addresses, telephone numbers, and contact person.

Copy of the Fire Marshal and Building Department Certificates of Occupancy.

Copy of all Certifications made by the State Department of Labor, such as Operating Permits for Elevators, Boiler or Pressure Vessels, etc.

Special warranties or certifications required for specific materials or equipment.

Maintenance Manuals:

Submit 3 copies of each required manual (Plumbing, Mechanical, Mechanical Controls, Sprinkler, Electrical). Additionally, provide a CD in each manual containing the entire contents of the manual.

Organize operating and maintenance data into suitable sets of manageable size. Bind data into individual binders properly identified and indexed. Bind each set of data in a heavy-duty D-ring, 3-ring vinyl covered binder with clear vinyl covers for identification sheets and pocket folders for folded sheet information. Mark the appropriate identification on both front and spine of each binder. Size binder(s) as necessary for documentation thickness.

Include the following types of information in operation and maintenance manuals:

Emergency instructions.

Spare parts listing.

Copies of warranties.

Wiring diagrams.

Recommended "turn-around" cycle.

Final acceptance of the project shall not be granted until General Contractor has submitted all the required "as-built" documents and GC Manuals to the A/E (and Owner) and to any governing entities that required them, such as Gwinnett County Department of Planning and Development, Gwinnett County Department of Public Utilities, etc.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

CLOSEOUT PROCEDURES:

General Operating/Maintenance Instructions: Arrange for each installer of work requiring continuing maintenance or operation, to meet with Owner's personnel, at project site, to provide basic instructions needed for proper operation and maintenance of entire work. Include instructions by manufacturer's representatives where installers are not expert in the required procedures. Review maintenance manuals, record documentation, tools, spare parts and materials, lubricants, fuels, identification system, control sequences, hazards, cleaning and similar procedures and facilities. For operational equipment, demonstrate start-up, shut-down, emergency operations, noise and vibration adjustments, safety, economy efficiency adjustments, energy effectiveness, and similar operations. Review maintenance and operations in relation with applicable warranties, agreements to maintain, bonds, and similar continuing commitments.

PROVIDE CERTIFICATES SHOWN AT THE END OF THIS SECTION

FINAL CLEANING:

General: Special cleaning for specific units of work is specified in sections of Divisions 2 through 16. General cleaning during progress of work is specified in General Conditions and as temporary services in "Temporary Facilities" section of this Division. Provide final cleaning of the work, at time indicated, consisting of cleaning each surface or unit of work to normal "clean" condition expected for a first-class building cleaning and maintenance program. Comply with manufacturer's instructions for cleaning operations. The following are examples, but not by way of limitation, of cleaning levels required:

Remove labels which are not required as permanent labels.

Clean transparent materials, including mirrors and window/door glass, to a polished condition, removing substances which are noticeable as vision-obscuring materials. Replace broken glass and damaged transparent materials.

Clean exposed exterior and interior hard-surfaced finishes, to a dirt-free condition, free of dust, stains, films and similar noticeable distracting substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.

Wipe surfaces of mechanical and electrical equipment clean.

Remove debris and surface dust from limited-access spaces including roof, plenums, shafts, trenches, equipment vaults manholes, attics and similar spaces.

Clean concrete floors in non-occupied spaces broom clean.

Vacuum clean carpeted surfaces and similar soft surfaces.

Clean plumbing fixtures to a sanitary condition, free of stains including those resulting from water exposure.

Clean light fixtures and lamps so as to function with full efficiency, replace bulbs not functioning as necessary.

Clean project site (yard and grounds), including landscape development areas, of litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, petro-chemical spills and other foreign deposits. Rake grounds which are neither planted nor paved, to a smooth, even-textured surface. Fill settlement areas of all utility trenches, including public utilities installed by others to provide a smooth even textured surface.

Remove project sign, fill post holes, rake and grass. Remove silt fences as directed where permanent vegetation is sufficiently established. Return as necessary and remove balance of silt fence as ground cover stabilizes grades.

Removal of Protection: Except as otherwise indicated or requested by Architect, remove temporary protection devices and facilities which were installed during course of the work to protect previously completed work during remainder of construction period.

Compliances: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site, or bury debris or excess materials on Owner's property, or discharge volatile or other harmful or dangerous materials into drainage systems; remove waste materials from site and dispose of in a lawful manner.

Where extra materials of value remaining after completion of associated work have become Owner's property, dispose of these to Owner's best advantage as directed.

CERTIFICATES:

Furnish the following certificates, affidavits and guarantees:

CERTIFICATE OF INSTRUCTION

GWINNETT COUNTY BOARD OF EDUCATION
53 Gwinnett Drive
Lawrenceville, Georgia 30046

Date: _____

Re: _____

Gentlemen:

Mechanical and Electrical equipment and all related controls in this building have been operated in the presence of the Owner and Architect and proper instructions have been furnished in the presence of the Architect to the Owner concerning operation and maintenance of all mechanical and electrical systems and all related controls and their functions on _____, 20____.

Very truly yours,

Contractor

BY: _____

Authorized Representative of Owner

SAMPLE

Contractor Note:

Furnish separate Certificates (on contractor's letterhead) for:

- Hardware Instruction
- Plumbing Instruction
- Mechanical Instruction (HVAC, including DDC System)
- Sprinkler Instruction
- Electrical Instruction (Normal Power Systems)
- Electrical Instruction (Emergency Power Systems)
- Electrical Instruction (Fire Alarm Systems)
- Electrical Instruction (Intercom System)

CERTIFICATE OF RECEIPT

GWINNETT COUNTY BOARD OF EDUCATION
53 Gwinnett Drive
Lawrenceville, GA 30046

Gentlemen:

All keys, operation manuals, and parts information was turned over to the Director of Construction on _____, 20____ as indicated below.

LIST OF ITEMS TURNED OVER:

<u>QUANTITY</u>	<u>ITEM</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

The above items received on _____, 20____.

Director of Construction

HAZARDOUS MATERIALS CERTIFICATE

CERTIFICATE OF GENERAL CONTRACTOR

OWNER: Gwinnett County Public Schools

JOB NAME: East Addition to North Gwinnett High School

ADDRESS: 20 Level Creek Road, Suwanee, GA 30024

COUNTY OF GWINNETT

STATE OF GEORGIA

DATE: _____

_____, as General Contractor on the above job, does hereby certify that all materials, products and assemblies incorporated, or submitted for incorporation into this Project, are totally free of asbestos, PCB, or other such hazardous materials.

This certificate covers all materials required by the plans and specified in the specifications and contract documents.

Nothing in the above shall be deemed to imply that this certificate shall apply to materials furnished by the Owner or installed by the Owner.

LEGAL NAME OF CONTRACTOR:

BY: _____

TITLE: _____

NOTARY PUBLIC

THIS _____ DAY OF _____, 20 ____.

My Commission expires _____.

HAZARDOUS MATERIALS CERTIFICATE

CERTIFICATE OF SUB CONTRACTOR (MATERIALMAN)

OWNER: Gwinnett County Public Schools

JOB NAME: East Addition to North Gwinnett High School

ADDRESS: 20 Level Creek Road, Suwanee, GA 30024

COUNTY OF GWINNETT

STATE OF GEORGIA

DATE: _____

_____, as the sub contractor (materialman) on the above job, does hereby certify that all materials, products, and assemblies incorporated, or submitted for incorporation into this Project, are totally free of asbestos, PCB, or other such hazardous materials.

This Certificate covers all materials required by the plans and specified in the specifications and contract documents.

Nothing in the above shall be deemed to imply that this Certificate shall apply to materials furnished by the Owner or installed by the Owner.

LEGAL NAME OF CONTRACTOR:

BY: _____

TITLE: _____

NOTARY PUBLIC

THIS _____ DAY OF _____, 20__.

My Commission expires _____.

HARDWARE CERTIFICATE

GWINNETT COUNTY BOARD OF EDUCATION
53 Gwinnett Drive
Lawrenceville, Georgia 30046

Date: _____

Re: _____

Gentlemen:

The below named hardware manufacturer's representative has inspected the hardware installation and certifies that all their installation recommendations and adjustments have been complied with. This applies to all hardware including, but not limited to, exit devices, door closers and locksets

Date of Inspection _____

By _____

Hardware Manufacturer's Representative

(Contractor Note: Provide multiple Certificates if necessary to cover all hardware).

SAMPLE

GUARANTEES

(a) Guarantee: If the specific item of work to be guaranteed is executed by the General Contractor, he shall furnish a written guarantee. If the work is executed under sub-contract, the General Contractor shall deliver to the Architect a written guarantee from the sub-contractor, countersigned and guaranteed by the General Contractor.

(b) It is specifically understood that the terms of the guarantee called for in the Contract Documents, the compliance therewith and the fulfillment of all obligations thereunder are fully protected by the Performance Bond furnished by the General Contractor for a period of one (1) year from date of official acceptance of the project. This does not relieve the General Contractor, his sub-contractor or the manufacturer for required guarantees and/or warranties in excess of one (1) year.

(c) A manufacturer's warranty on any item shall not relieve the General Contractor and/or his sub-contractor from full responsibility under all guarantees and/or warranties called for in the Contract Documents.

(d) The guarantee shall be typed on the letterhead of the contractor (or subcontractor), shall contain the following provisions and shall be in the exact form as hereinafter written:

GUARANTEE

COUNTY OF _____ STATE OF _____

NAME OF PROJECT East Addition to North Gwinnett High School

_____ as (General Contractor) (Sub-Contractor) on the above named project does hereby guarantee that all _____ work executed under the requirements of the Contract Documents shall be free from defects due to faulty materials and/or workmanship for a period of _____ year (s) from the date of official acceptance of the project by the Owner, and hereby agrees to remedy defects due to faulty materials and/or workmanship and pay for any damage resulting therefrom, at no cost to the Owner.

Nothing in this guarantee shall be deemed to apply to work which has been abused or neglected by the Owner.

ATTEST (Notary Public)

BY: _____

THIS _____ DAY OF _____, 20____.

Name of Contracting Firm

BY: _____

TITLE: _____

STATUTORY AFFIDAVITS

The General Contractor shall furnish to the Owner at the completion of the project a Statutory Affidavit containing the following provisions and shall be in the exact form as hereinafter written. It shall be typed on the Contractor's letterhead and submitted with his request for final payment.

GENERAL CONTRACTOR STATUTORY AFFIDAVIT:

STATUTORY AFFIDAVIT

COUNTY OF _____

STATE OF _____

FROM: _____
(General Contractor)

TO: Gwinnett County Board of Education, Lawrenceville, Georgia, Owner.

RE: Contract entered into the _____ day of _____, 20____, between the above-mentioned parties for the construction of:

CONSTRUCTION OF
East Addition to North Gwinnett High School

KNOW ALL MEN BY THESE PRESENTS:

1. The undersigned hereby certifies that all work required under the above contract has been performed in accordance with the terms thereof, that all materialmen, subcontractors, mechanics, and laborers have been paid and satisfied in full, and that there are no outstanding claims of any character (including disputed claims or any claims to which the contractor has or will assert any defense) arising out of the performance of the contract which have not been paid and satisfied in full except as listed herein below:

(Instructions - Enter the word "NONE" or list the names of claimants and the amount claimed by each.)

2. The undersigned further certifies that to the best of his knowledge and belief there are no unsatisfied claims for damages resulting from injury or death to any employees, subcontractors, or the public at large arising out of the performance of the contract, or any suits or claims for any other damage of any kind, nature, or description which might constitute a lien upon the property of the Owner.

3. The undersigned makes this affidavit for the purpose of receiving final payment in full settlement of all claims against the Owner arising under or by virtue of the Contract, and acceptance of such payment is acknowledged as a release of the Owner from any and all claims arising under or by virtue of the Contract.

This _____ Day of _____, 20____.

(L.S.)

Signature

Title

Firm

COUNTY OF _____

STATE OF _____

Personally before me, the undersigned authority appeared, _____, who is known to me to be an official of the firm of _____, who, after being duly sworn, stated on his oath that he had read the above statement and that the same is true and correct.

Notary Public

My Commission expires _____

This _____ Day of _____, 20____.

The General Contractor shall furnish to the Owner at the completion of the project a Statutory Affidavit from all sub-contractors and materialmen containing the following provisions and shall be in the exact form as hereinafter written. The Affidavit shall be typed on the subcontractor's or materialman's letterhead and submitted with his request for final payment.

SUBCONTRACTOR OR MATERIALMAN STATUTORY AFFIDAVIT:

STATUTORY AFFIDAVIT

COUNTY OF _____

STATE OF _____

FROM: _____

(Sub-contractor/Materialman)

TO: (State Name of General Contractor and Name of City in which General Contractor is located), Georgia.

RE: Contract entered into the _____ day of _____, 20____, between the above-mentioned parties for the construction of:

**CONSTRUCTION OF
East Addition to North Gwinnett High School**

KNOW ALL MEN BY THESE PRESENTS:

1. The undersigned hereby certifies that all work required under the above contract has been performed in accordance with the terms thereof, that all materialmen, sub-contractors, mechanics, and laborers have been paid and satisfied in full, and that there are no outstanding claims of any character (including disputed claims or any claims to which the Contractor has or will assert any defense) arising out of the performance of the contract which have not been paid and satisfied in full except as listed herein below:

(Instructions - Enter the word "NONE" or list the names of claimants and the amount claimed by each.)

2. The undersigned further certifies that to the best of his knowledge and belief there are no unsatisfied claims for damages resulting from injury or death to any employees, sub-contractors, or the public at large arising out of the performance of the contract, or any suits or claims for any other damage of any kind, nature, or description which might constitute a lien upon the property of the Owner.

3. The undersigned makes this affidavit for the purpose of receiving final payment in full settlement of all claims against the Owner arising under or by virtue of the Contract, and acceptance of such payment is acknowledged as a release of the Owner from any and all claims arising under or by virtue of the Contract. Contractual amount outstanding:

(Instructions: Enter the word "None" or list the amount due, i.e., retainage or retainage plus other amounts.)

This _____ Day of _____, 20 _____.

(L.S.)

Signature

Title

Firm

COUNTY OF _____

STATE OF _____

Personally before me, the undersigned authority, appeared _____

who is known to me to be an official of the firm of _____, who, after being duly sworn, stated on his oath that he had read the above statement and that the same is true and correct.

Notary Public

My Commission expires _____

This _____ Day of _____, 20 _____.

General Contractor Agreement to Amount Due (initial) _____.

ARTICLE 18 - NON-INFLUENCE AFFIDAVIT

The General Contractor shall furnish to the Owner at the completion of the project at Non-Influence Affidavit containing the following provisions and shall be in the exact form as hereinafter written. It shall be typed on the Contractor's letterhead and submitted with his request for final payment.

NON-INFLUENCE AFFIDAVIT

COUNTY OF _____

STATE OF _____

I do solemnly swear on my oath that as to the contract dated _____, between _____ and Gwinnett County

Board of Education, I have no knowledge of the exertion of any influence on the firm on behalf of which this affidavit is made in any way, manner, or form in the purchase of materials, equipment, or other items involved in construction, manufacture, or employment of labor under the aforesaid contract by any employee, officer, or agent of Gwinnett County Board of Education, or any person connected with the State Government of Georgia in any way whatsoever.

This ____ Day of _____, 20____.

SAMPLE

Signature

Title

Firm

COUNTY OF _____

STATE OF _____

Personally before me, the undersigned authority, appeared _____, who is known to me to be an official of the firm of _____, who, after being duly sworn, stated on his oath that he has read the above statement and that the same is true and correct.

Notary Public

My Commission expires _____

This ____ Day of _____, 20____.

End of Section 017000

SECTION 020700 - SELECTIVE DEMOLITIONPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of demolition work inside existing buildings is indicated on drawings.

SUBMITTALS:

General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

Schedule indicating proposed sequence of operations for selective demolition work to Owner's Representative for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.

Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.

Coordinate with Owner's continuing occupation of portions of existing building.

Walk through existing portions of the existing building where modifications or new work will occur prior to starting such work with the Owner's Representative(s). Identify damaged conditions prior to beginning.

Photographs of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Owner's Representative prior to start of work.

JOB CONDITIONS:

Demolition in existing buildings shall be done and completed **ONLY** as indicated in Section 010200, Phasing. Consult with Owner for Phasing of all work.

Job Conditions: Visit the site of the proposed work and determine the conditions existing at the job site. After contract has been awarded, no consideration shall be given for conditions reasonably visible or discernible in the original conditions of the site or existing building.

See also Temporary Facilities.

Existing Operations: It is understood and agreed that the Owner is now occupying and conducting his business in the existing building and will continue to do so during the progress of the work. The Contractor shall keep the passages of the building open and free from obstructions at all times for the use of the Owner and shall provide ample protection for the public against the elements and possible harm or injury from any operations of the building work during the entire period of work. Material storage areas and Contractor's operations shall be kept clear of all Owner activities and confined to designated areas. Protect all existing work from damage by construction operation. All ingress for materials and excavation route for debris shall be as approved by the Owner.

All work shall be scheduled so as to not interrupt normal school activities. The contractor shall coordinate his work so as not to interfere with special school functions after normal working or school hours. Drives and walks shall be maintained at all times.

Where work of any nature is done in the existing building, protect existing finishes to remain by whatever means necessary. Replace if damaged.

Where demolition involves existing roof areas, eaves, exterior wall openings or exterior wall veneers, the Contractor shall be responsible for protection of the interior finishes and Owner furnishings. The Contractor shall repair/replace materials, finishes or furnishings damaged by weather at no additional cost to the Owner.

AHERA (Asbestos Hazard Emergency Response Act):

If there is any ACBM which will be disturbed by the work included in this contract, the Owner will have this removed.

1. Cease work in the area of the suspect material.
2. Remove all workmen and barricade the area.
3. Do not disturb or remove any of the suspect material.
4. Notify Owner's representatives, Project Coordinator or Director of Construction, by telephone and confirm in writing to the above address.
5. Report scheduling needs to the above individuals.

The Owner will have the material tested and, if necessary, removed in accordance with AHERA standards. If removal is required, this contractor shall cooperate with the asbestos removal contractor to minimize delay to the project. If these tests show that no asbestos is present, all costs of the tests shall be paid by the contractor.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

Accomplish demolition as necessary to facilitate the building construction as shown on the drawings. Include removal of plumbing, mechanical, electrical equipment, walls, etc., as required.

Debris shall become the property of the Contractor and removed promptly from the site.

Contractor shall take all precautions necessary to protect adjacent work. If the Contractor fails to provide protection and damage results, he shall replace damaged area with new construction at no expense to the Owner.

The Contractor shall comply with all city, state, and national regulations, ordinances, etc., which govern.

In the demolition work, no construction shall be allowed to fall in mass. Bulky material shall be lowered and not allowed to fall.

All existing construction, utilities, etc., to remain shall be properly shored, protected, and maintained during demolition work. Replace all damaged existing construction.

Where remodeling occurs, all equipment, devices, utilities, removed and not relocated, shall be capped or terminated in such a manner so as not to interfere with existing systems or utilities to remain.

Where walls are removed relocate all active devices or utilities to nearest location as directed.

Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

Flame Cutting: Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.

BARRICADES:

Contractor shall build and maintain temporary enclosures, barricades, bracing, and shoring to protect public and workmen from injury.

NOISE CONTROL:

Contractor shall make every effort to effect a satisfactory noise abatement program during school hours.

Use sound deadening materials where required, such as heavy blankets, barriers, etc., so as to reduce disturbances to classroom is session.

Contractor shall coordinate with Owner to insure that construction noise is eliminated on days designated for State Department of Education testing.

DUST CONTROL:

Where cutting or removing materials which will generate dust and dirt, the Contractor shall provide temporary dust curtains, solid barricades, or the like, to retain and control dust relative to the area in which work is occurring. Clean areas of dust as soon as practicable so as not to allow its spread by pedestrian traffic, etc.

Provide Fire Rated Temporary Partitions as specified under Temporary Facilities.

RETENTION OF MATERIALS:

The Owner reserves the option to retain any materials and equipment he selects. The Contractor shall disconnect, remove and deliver items selected to the Board of Education's Central Warehouse in Lawrenceville, GA. The Contractor shall remove and dispose of all other material.

COORDINATION:

Attention is directed to the fact that Owner's occupancy must continue at all times. Take every precaution to keep interference with that occupancy to a minimum. Schedule all work to avoid interruptions in the normal school activities.

Adequate means for security closing of all openings shall be provided.

The Existing Building must remain free of hazards to occupants and contents at all times.

TEMPORARY BARRIERS:

Temporary Safety Barriers shall be erected at shafts, openings, and other hazards.

DEMOLITION AND CUTTING FOR ELECTRICAL AND MECHANICAL WORK:

Contractor shall do all cutting and patching of walls and roofs necessary for installation of electrical and mechanical work. This work shall be coordinated with the mechanical and electrical work.

Openings cut in roof shall be coordinated with all trades concerned so that all possibilities of water damage to the building is eliminated and all openings shall be immediately protected and closed.

DISPOSAL OF DEMOLISHED MATERIALS:

Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site.

Burning or burying of removed materials is not permitted on project site.

CLEAN-UP AND REPAIR:

Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protection and leave interior areas broom clean.

Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

End of Section 020700

SECTION 021100 - SITE WORKPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

SUBSURFACE EXPLORATION REPORT:

The Report of Subsurface Exploration on this project is on file and is available for inspection in the Architect's office. The Subsurface Exploration Report is not bound in these documents. Contractors who wish to receive a copy of the Subsurface exploration Report may obtain a copy of the Report by emailing Michael McKenzie with Nova Engineering (mmckenzie@usanova.com) and request the report. An electronic copy of the reports will be returned by email.

DESCRIPTION OF WORK:

Extent of site clearing is shown on drawings.

Contractor shall visit the site, familiarize himself with actual conditions, and verify existing conditions in the field.

Site clearing work includes, but is not limited to:

Removal of existing asphalt or concrete paving, base, demolished structures, deleterious materials, foundations, abandoned underground utilities such as storm sewers, water lines,.

Removal of trees, stumps, shrubbery and other vegetation.

Topsoil stripping.

Clearing and grubbing

Haul in will be required. Haul in shall be included in the Base Bid.

JOB CONDITIONS:

Protection of Existing Improvements: Provide protection necessary to prevent damage to existing improvements.

Any excavations required in the vicinity of existing school buildings shall not be started until Contractor has reviewed all available existing plans at Owner's office at 53 Gwinnett Drive Lawrenceville, Georgia and reviewed same with the Architect and the Owner's Construction Coordinator.

Protect improvements on adjoining properties and on Owner's property.

Restore any damaged improvements immediately to their original condition, as acceptable to parties having jurisdiction.

Contractor shall provide dust control throughout project life.

Contractor shall secure the services of a private utility locator firm during the entire course of the work to locate all utilities. Any active utility damaged during construction shall be repaired and put back in service immediately at no cost to the owner.

UTILITIES PROTECTION LAW (DIG LAW):

Comply with the Georgia Utilities Protection Law. Notice must be given to the Utilities Protection Center (1-800-282-7411 throughout Georgia; 404-325-5000 Atlanta Area Only) three (3) working days preceding the day the work (digging) is to begin. This notice must contain County (where project is located), Town (or closet city or town), Location (Street Address), Type of Work to be done, Name of Contractor, Company Name and Address, Telephone Number, Which Company/Individual (the work is being done for), Date and Time the Contractor is planning to dig.

PART 2 - PRODUCTS Not applicable to work of this section.

PART 3 - EXECUTION

ENGINEERING AND LAYOUT:

Layout work shall be done under supervision of a Registered Georgia Land Surveyor. Grade stakes shall be set at fifty (50) feet on centers each way at graded areas.

Before the work is started, the Contractor shall stake out the entire line of work and establish bench marks and reference points. This work will be examined by the Architect and after approval, the contractor will complete the staking.

Contractor shall verify all property corners and bench marks within fifty (50) feet of any clearing or grading operation by driving one #6 bar four feet long, six inches from pin point or monument and paint pin a bright yellow. Contractor shall provide stakes, with white ribbon, at 50 ft intervals along property lines within 200' of limits disturbance.

Testing and Inspection Service:

Owner will engage soil testing and inspection service for quality control testing during site and earthwork operations.

Note: Retest of fill placed by the contractor and not meeting specified requirements shall be at the contractor's expense.

Refer to the General Conditions (GCPS - General Conditions, Revision VII, 07/15/11). In the event that tests reveal the placement of fill materials by the contractor that do not meet the requirements of the Specifications, all costs for the removal of the unsatisfactory materials, the replacement and re-testing thereof shall be borne by the contractor.

SITE CLEARING:General:

Clearing and equipment movement shall be limited to areas designated on site plans and shall not disturb the existing terrain or trees outside the work area.

Remove shrubs, grass and other vegetation, improvements, or obstructions interfering with installation of new construction. Remove such items elsewhere on site or premises as specifically indicated. Removal includes digging out stumps and roots.

Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4". Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2" in diameter, and without weeds, roots, and other objectionable material.

Strip topsoil to a minimum depth of 4" in building, paved and fill areas in a manner to prevent intermingling with underlying subsoil or other objectionable material. Strip topsoil in other graded areas a minimum of 4".

Remove heavy growths of grass from areas before stripping.

Stockpile sufficient topsoil for reuse in storage piles in areas where directed. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent wind-blown dust. Re-spread topsoil as project conditions permit at finish graded areas to be planted.

Dispose of unsuitable materials, excess topsoil or excess suitable soils same as waste material, herein specified. Haul in will be required. Haul in shall be included in the Base Bid.

Clearing and Grubbing: Clear the building, paved, and graded areas of trees, shrubs and other vegetation.

Completely remove stumps, roots, and other debris protruding through ground surface regardless of whether they are a result of this operation or not.

Contractor shall not clear within 25' of property lines.

Fill depressions caused by clearing and grubbing operations with satisfactory compacted soil material, unless further excavation or earthwork is indicated.

Place fill material in horizontal layers not exceeding 6" loose depth, and thoroughly compact to a density equal to adjacent original ground.

Proofrolling: After clearing, (unless further grading is indicated), proofroll the paved areas and building areas in two directions with heavily loaded dump trucks or similar equipment to densify near-surface soils and to reveal any unstable areas that may exist. This work will be evaluated by the Geotechnical Engineer. Any undercut of unstable areas at final subgrade and replacement fill necessary will be paid for under Changes in Work.

Note: See Section 025400, Erosion, Sedimentation and Pollution Controls. Following clearing, stripping and grubbing, grades left undisturbed for 14 days shall receive temporary grassing and mulch.

DISPOSAL OF WASTE MATERIALS:

Burning on Owner's Property: Burning will not be permitted on Owner's property.

All trees, stumps, roots, limbs and other organic growth shall be removed from the site.

Removal from Owner's Property: Remove waste materials from Owner's property and dispose of off site in legal manner, at no additional cost to Owner.

Burial of debris or use of topsoil to fill out slopes shall not be permitted.

Fill from grading operations can be used for backfill and fill and shall be tested for use as fill. All such fill shall have compaction tests. Material not judged suitable for use as fill shall be disposed of offsite.

Placement and Compaction: Place backfill and fill materials in layers not more than 6" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers. Compact to at least 95% ASTM D 698. The upper 12 inches of soil beneath building slabs shall be compacted to 98%.

Before compaction, moisten or aerate each layer as necessary to maintain optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

Proposed fills shall be laboratory tested prior to construction use to determine their standard Proctor parameters.

Additional Excavation: When excavation has reached required sub-grade elevations, notify Architect/Engineer who will make an inspection of conditions.

If unsuitable bearing materials are encountered at required sub-grade elevations other than that shown on the drawings, consult Architect and Engineer, carry excavations deeper and replace excavated material only as directed by Architect and Engineer.

Removal of unsuitable material below subgrade and its replacement as directed will be paid on basis of contract conditions relative to changes in work at unit prices as stated in the Proposal.

Dust Control:

Contractor shall maintain a water truck on site during dry weather conditions to provide adequate wetting of soils and prevent dust migration off-site.

End of Section 021100

SECTION 022000 - EARTHWORKPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

SUBSURFACE EXPLORATION REPORT:

The Reports for Subsurface Exploration on this project are on file and are available for inspection in the Architect's office. Contractors desiring a copy of the Subsurface Soils Reports may email Michael McKenzie with Nova Engineering (mmckenzie@usanova.com) and request the report. An electronic copy of the reports will be returned by email.

DESCRIPTION OF WORK:

Contractor shall visit the site, familiarize himself with actual conditions, and verify existing conditions in the field.

Extent of earthwork is indicated on drawings.

Preparation of subgrade for building slabs, walks, and pavements is included as part of this work.

Haul-in of soils is included as part of this work.

Excavation for Mechanical/Electrical Work: Excavation and backfill required in conjunction with underground mechanical and electrical utilities, and buried mechanical and electrical appurtenances shall be accomplished in accordance with this section, including testing. Contractor shall be responsible for remediation of any settlement issues with relocated power company service lines.

DEFINITIONS:

Excavation: consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

Open Areas: Open areas shall be those areas that do not include building sites, paved areas, street right-of-way and parking areas.

Maximum density: Maximum laboratory dry weight in pounds per cubic foot of a specific material as determined by Standard Proctor.

Optimum Moisture: Percentage of water in a specific material at maximum density.

General Earth Excavation: All material regardless of its nature or composition (includes excavation of pavements and other obstructions visible on ground surface; underground structures, utilities and other items indicated to be demolished and removed) that can be removed by scrapers, loaders, pans, dozers, or graders up to and including that material which requires the use of a single tooth ripper mounted on a crawler tractor having a minimum draw bar pull rated at not less than **75,000 pounds**, shall be defined as General Earth Excavation.

General Rock: Any material occupying an original volume of more than one cubic yard which cannot be excavated with a single-tooth ripper drawn by a crawler tractor having a minimum draw bar pull rated at not less than **75,000 pounds**.

Trench Rock: Any material occupying an original volume of more than one cubic yard which cannot be excavated with a trackhoe having a bucket curling force rated at not less than **42,000 pounds**, using a rock bucket and rock teeth.

Suitable Soil: Materials for fills shall be clay or a mixture of sand and clay and shall be free from vegetation, organic material, silt or muck classified as Class I and Class II in accordance with Georgia D.O.T. Specifications, Section 810.01.

Unsuitable Soil: Unsuitable materials are highly organic soil (peat or muck) classified as Class IV in accordance with Georgia D.O.T.

Unsuitable materials: Unsuitable materials are mass rock, trench rock, and unsuitable soils

Topsoil: Fertile, friable, natural soil of a loamy character free of clay lumps, stones, or other objectionable material, which is suitable for spreading on banks, shoulders, and grassed fields.

Structural fill is defined as suitable soils placed in relatively thin (4 to 8 inch) layers and compacted to at least 95 percent of the soil's maximum dry density as determined by the standard Proctor compaction test (ASTM D-698).

Maximum particle size should be limited to 6 inches in mass graded areas and 3 inches in utility trenches and behind retaining walls. The soil shall exhibit a plasticity index of less than 30.

Decomposed rock, rip rock and similar material that can be removed by tractor drawn ripper or power machinery as previously mentioned will be classified as earth excavation. Decomposed rock shall be pulverized to material less than 6" in diameter and utilized in fills as allowed by the geotechnical engineer. Contractor shall expect to have on site a heavy, self propelled sheeps foot roller (such as a Caterpillar 815) for breaking down such material as decomposed rip rock.

QUALITY ASSURANCE:

Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

Testing and Inspection Service:

Owner will engage soil testing and inspection service for quality control testing during earthwork operations.

Note: Retest of fill placed by the contractor and not meeting specified requirements shall be at the contractor's expense.

Refer to the General Conditions. In the event that tests reveal the placement of fill materials by the contractor that do not meet the requirements of the Specifications, all costs for the removal of the unsatisfactory materials, the replacement and re-testing thereof shall be borne by the contractor.

Any excavations required in the vicinity of existing school buildings shall not be started until Contractor has reviewed all available existing plans at Owner's office at 53 Gwinnett Drive Lawrenceville, Georgia and reviewed same with the Architect and the Owner's Construction Coordinator.

SUBMITTALS:

Test Reports-Excavating: Submit following reports directly to Architect/Engineer from the testing services, with copy to Contractor:

Test reports on borrow material.

Verification of each footing subgrade.

Field density test reports.

One optimum moisture-maximum density curve for each type of soil encountered.

JOB CONDITIONS:

Contractor shall secure the services of a private utility locator firm during the entire course of the work to locate all utilities.

The Contractor shall retain a Registered Georgia land Surveyor for all layout and survey work.

The Contractor shall provide an “As-Built” survey , including all existing site conditions and all new site improvements at no additional cost to the Owner. Survey shall include one foot contours at all athletic fields along with spot elevations on athletic fields at a twenty (20) foot by twenty (20) foot grid. Survey shall include spot elevations, storm line structure tops and inverts, sanitary structure tops and inverts, utility line locations, spot elevations at all doors, building corners, tops and bottoms of stairs, including landings and ramps. See Section 010440 for Site Survey. See Section 027200 for storm water Management survey/certification requirements.

Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

UTILITIES PROTECTION LAW (DIG LAW):

Comply with the Georgia Utilities Protection Law. Notice must be given to the Utilities Protection Center (1-800-282-7411 throughout Georgia) three (3) working days preceding the day the work (digging) is to begin. This notice must contain County (where project is located), Town (or closet city or town), Location (Street Address), Type of Work to be done, Name of Contractor, Company Name and Address, Telephone Number, Which Company/Individual (the work is being done for), Date and Time the Contractor is planning to dig.

USE OF EXPLOSIVES: The use of explosives is not permitted.

Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

Operate warning lights as recommended by authorities having jurisdiction.

Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

Subsurface Soil Conditions: No responsibility is assumed by the Architect for subsoil quality or conditions. If, as a result of the Architect's observations, or he is put on inquiry, or in the Architect's opinion the bearing values are questionable, he may order a laboratory inspection before authorizing the placing of fill. The laboratory will be selected by the Architect and paid by the Owner.

PART 2 - PRODUCTS

SOIL MATERIALS:

Definitions:

Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW and SP.

Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH and PT.

Gravel Fill (Granular Base): Install 4" of compacted crushed (crusher run) gravel under all slabs on grade.

Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter.

Structural fill is defined as organic-free soils placed in relatively thin (4 to 8 inch) layers and compacted to at least 95 percent of the soil's maximum dry density as determined by the standard Proctor compaction test (ASTM D-698).

Maximum particle size should be limited to 6 inches in mass graded areas and 3 inches in utility trenches and behind retaining walls. The soil shall exhibit a plasticity index of less than 30.

ACCESSORIES:

Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches 150 mm wide and 4 mils 0.1 mm thick, continuously inscribed with a description of the utility; colored as follows:

Colors below to comply with local practice or requirements of authorities having jurisdiction.

Red: Electric.

Yellow: Gas, oil, steam, and dangerous materials.

Orange: Telephone and other communications.

Blue: Water systems.

Green: Sewer systems.

Where sleeves for future use and/or PVC piping for water lines occur, install warning tapes with metallic core to make them detectable. Install 12" above pipe. Tape shall rise out of ground and be attached to a marker. Sleeves under drives shall be minimum 4' below finished final grade. Sleeves shall be capped both ends and concrete valve marker post set flush with grade each end of sleeve, minimum 4' beyond curb. Paint top of marker white.

PART 3 - EXECUTION

EXCAVATION:

Grade elevations: The site shall be graded to the elevations and contours shown on the drawings without deviations.

Contractor Note: There will be insufficient soils on this site. The Contractor shall incorporate in his base bid haul-in of suitable soils from offsite.

Temporary Grading and Drainage: Provide effective drainage for the entire site at all times. Watersheds shall be diverted by ditching or embankment, to prevent encroachment of subsurface water in graded areas or excavations. No impoundment of water will be permitted except as provided. Pools, puddles, or inundated excavations shall be drained immediately. Existing roof drainage shall be diverted away from new construction until permanent roof drainage collection can be implemented.

UNSUITABLE MATERIAL:

During grading and excavation phases should the following conditions be encountered: mass rock, trench rock, trench earth excavation, earth excavation, earth fill and unsuitable soils, the Contractor shall immediately notify the Architect who will observe and determine the appropriate action necessary for the work to proceed. If, in the opinion of the Architect, additional work is required, that portion pertaining to any of the foregoing conditions will be performed on a unit cost or time and material basis, as determined by the Architect and the contract shall be equitably adjusted by change order in accordance with the GENERAL CONDITIONS ARTICLE, CHANGES IN THE WORK. Unit prices stated in the proposal shall include cost of material, sales tax, delivery, labor, fringe benefits, worker's compensation, supervision and any other costs and including profit and overhead. Overhead and profit included in allowances remains in the allowance when the allowance is credited to the owner.

After reaching subgrade any undercut of unstable areas and fill necessary will be paid for as changes in the work in accordance with unit prices.

Excavation Classifications: The following classifications of excavation will be made when rock excavation is encountered in work:

Earth Excavation includes excavation of pavements and other obstructions visible on ground surface; underground structures, utilities and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.

ROCK EXCAVATION:

General Excavation: Any material which cannot be excavated with a heavy ripper drawn by a crawler tractor having a minimum bar draw pull rated at not less than 75,000 pounds, and occupying an original volume of at least one (1) cubic yard or more shall be considered rock.

Trench Excavation: Any material which cannot be excavated with a backhoe with rock-bucket with rock tooth and having a break-out force rated at not less than 42,000 pounds and occupying an original volume of at least one-half (1) cubic yard or more shall be considered trench rock.

Payment for removing rock shall be in accordance with change order procedures on a unit cost basis or a time and material basis as agreed to prior to commencing the work. Quantities shall be verified by Architect/Engineer.

Trenches in excess of 10'- 0" widths and pits in excess of 30' - 0" in either length or width are classified as open excavation.

When rock is encountered, the earth shall be cleared away and the Architect shall be notified.

Rock payment lines are limited to the following:

Two feet outside of concrete work for which forms are required, except footings.

One foot outside perimeter of footings.

In pipe trenches, 6" below invert elevation of pipe and 2 ft. wider than inside diameter of pipe, but not less than 3 ft. minimum trench width.

Neat outside dimensions of concrete work where no forms are required.

Under slabs on grade, 6" below bottom of concrete slab.

UNIT PRICES/ALLOWANCES:

The following unit prices are amounts to be used for work that will be added to or deleted from the Contract by Change Order in the event such additional work may be required.

Unit prices are complete for labor, equipment, material, the hauling in of needed material and the hauling off and disposal of excess and unsuitable material, installation, acceptable taxes, overhead and profit and all other incidental costs.

OWNER reserves the right to accept or reject these unit prices or require the Work to be performed on a time and material basis with complete daily breakdowns and logs submitted.

DESCRIPTION:

EARTHWORK MATERIALS UNIT
PRICE / ALLOWANCE SCHEDULE:

UNIT PRICE

AMOUNT OF
ALLOWANCE

**The following quantities shall be included
in the Base Bid as Allowances:**

A.	Mass Rock excavation, and disposed of off site (100c.y.):	\$ _____ per cubic yard	\$ _____
B.	Trench Rock excavation, and disposed of off site (100 c.y.):	\$ _____ per cubic yard	\$ _____
C.	Excavate and haul offsite unsuitable soils (500cy):	\$ _____ per cubic yard	\$ _____

- D. Provide suitable soil from offsite and compact in-place to replace excavated rock or unsuitable soil (500 c.y.): \$ _____ per cubic yard \$ _____

EARTHWORK-RELATED MATERIALS

UNIT PRICE SCHEDULE:

The following quantities shall be included in the Base Bid as Allowances:

- E. Haul in and placement of #3 stone or #34 stone (100 tons): \$ _____ per ton \$ _____
- F. Haul in and placement (including compaction) of crushed stone (G.A.B.) (250 tons): \$ _____ per ton \$ _____
- G. Haul in and placement of #57 stone (250 tons): \$ _____ per ton \$ _____
- H. Material and placement of geotechnical fabric (Tensar BX 1100 or equal) (500 s.y.): \$ _____ per s. y. \$ _____

The above allowances are to be used at the discretion of the Owner representatives and the Architect and are not intended for use by the Contractor without joint agreement by the Owner representative and the Architect.

Allowances shall be shown in the Schedule of Values as a single line item.

A Schedule of Allowances shall be provided as separate backup.

The above unit prices will also be used to determine any credit due the Owner on any changes in the work.

CONTRACTOR NOTE: Unit Prices shall reflect a reasonable price for the work shown based on current market conditions. Unreasonably high or low Unit Prices will be cause for rejection of the Proposal.

The above volumes are before excavation and after compaction and are to be verified by survey by the Owner or by other means acceptable to the Owner and the Contractor. The above allowances are for the Architect and Owner's use in administering the contract, NOT for use by the contractor at his discretion.

EXCAVATION:Proof rolling:

After grading to the required elevations, Proofroll the building areas in two directions with heavily loaded dump trucks or similar equipment to density near-surface soils and to reveal any unstable areas that may exist. This work will be evaluated by the geotechnical engineer. Any undercut of unstable areas and fill necessary will be paid for under the Contract by Change Order in the event such additional work may be required, using unit prices stated above.

Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect/Engineer. Unauthorized excavation, as well as remedial work directed by Architect/Engineer, shall be at Contractor's expense.

Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Architect/Engineer.

Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Architect/Engineer.

Stability of Excavations: Slope sides of excavations and deep cuts to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.

Maintain sides and slopes of excavations and cuts in safe condition until completion of backfilling.

Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.

Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

Dispose of excess soil material and waste materials as herein specified.

Excavation for Structures: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.

In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required thickness and grades to leave solid base to receive other work.

Excavation for utility trenches: Excavate trenches to indicated gradients, lines, depths, and elevations.

Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit.

Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.

For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.

Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown.

Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 deg. F (1 deg. C).

COMPACTION:

General: Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.

Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density, determined in accordance with ASTM D 698.

Structures, Building Slabs and Steps, Pavements: Compact top 12" of subgrade and each layer of backfill or fill material at 95% maximum density except under building slabs compact top 18 inches to 98%.

Lawn or Unpaved Areas: Compact top 6" of subgrade and each layer of backfill or fill material at 95% maximum density.

Walkways: Compact top 6" of subgrade and each layer of backfill or fill material at 90% maximum density.

Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.

Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

BACKFILL AND FILL:

General: Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.

In excavations, use satisfactory excavated or borrow material.

Under grassed areas, use satisfactory excavated or borrow material.

Under walks and pavements, use subbase material, or satisfactory excavated or borrow material, or combination of both.

Under steps, use subbase material.

Under building slabs, use tested structural fill material. Install 4" compacted G.A.B. base under all building slabs.

Partially Weathered Rock:

Partially weathered rock may be utilized on site as directed by the A/E and soils Engineer. The Contractor shall provide the use of heavy compaction equipment, equivalent to a Caterpillar 815, for breaking down partially weathered rock. Cobble size or boulder size material which does not breakdown shall be treated similar to rock fill.

Rock Fill: No deep fill areas are available. Rock shall be removed from the site per rock allowances.

Backfill excavations as promptly as work permits, but not until completion of the following:

Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.

Inspection, testing, approval, and recording locations of underground utilities.

Removal of concrete form work.

Removal of shoring and bracing, and backfilling of voids with satisfactory materials.

Removal of trash and debris.

Permanent or temporary horizontal bracing is in place on horizontally supported walls.

UTILITY TRENCH BACKFILL:

Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

Place and compact initial backfill of satisfactory soil material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit.

Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

Coordinate backfilling with utilities testing. General Contractor shall insure that all settlement in utility trenches is repaired, including that of public utilities.

Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed. Place and compact final backfill of satisfactory soil material to final subgrade.

Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

Placement and Compaction: Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers.

Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

NOTE: Contractor shall be responsible for remediation of any settlement issues with relocated power company service lines.

GRADING:

General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

Finish surfaces free from irregular surface changes, and as follows:

Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations.

Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation, coordinate with FDAR section requirements.

Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2" above or below required subgrade elevation.

Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2" when tested with a 10' straightedge.

Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.

When a compacted subbase course is shown to be 6" thick or less, place material in a single layer. When shown to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

VAPOR BARRIER:

Material specified under Section 033100 - Concrete.

Vapor Barrier: Install vapor barrier over subgrade, lapping joints 6". Provide another layer of vapor barrier over any punctures or tears, lapping edges of ruptured barrier at least 12".

Edge Treatment: Turn up barrier to top of slab at edges of all slabs, unless otherwise detailed.

FIELD QUALITY CONTROL:

Quality Control Testing During Construction: Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.

Perform field density tests in accordance with ASTM D 698.

Footing Subgrade: For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to Architect/Engineer.

Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 5000 sq. ft. of paved area and 2000 sq. ft. building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2000 sq. ft. of overlaying building slab or 5000 sq. ft. paved area, but in no case less than 3 tests.

Foundation Wall Backfill or Retaining Wall: Take field density tests, at locations and elevations as directed.

Tests shall be performed on at least 2 foot vertical increments.

If in opinion of Architect/Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

MAINTENANCE:

Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

Contractor shall be fully responsible for any damage occurring to property above or below the site which is the result of drainage or silt from off the site, or as the result of any work under this contract. Contractor shall inspect the entire area of the site and adjacent to site and take all precautions to protect adjacent property.

Commence all fills at outermost part of the fill and slope towards original ground so that all storm water drains back away from fill and does not run over top of fill slope. Construct swales a bottoms of fill slopes prior to the construction of any fills. Construct and maintain a swale at the outermost part of fills as fills are constructed.

Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

DISPOSAL OF EXCESS SOIL AND WASTE MATERIALS:

Removal from Owner's Property: Remove waste materials, trash and debris, and dispose of it in a legal manner off Owner's property, at no additional cost to the Owner.

DUST CONTROL:

Contractor shall maintain a water truck onsite during dry weather conditions to provide adequate wetting of soils and prevent dust migration off-site.

End of Section 022000

SECTION 022760 - MECHANICALLY STABILIZED EARTH WALLSPART 1 – GENERALDESCRIPTION:

Mechanically Stabilized Earth Wall (MSEW) - The work includes furnishing and constructing a system, including leveling pad, masonry block units, geosynthetic soil reinforcement, unit fill, select backfill, and related materials required for MSEW construction to the lines and grades shown on the construction drawings and specified herein.

RELATED SECTIONS:

Section 021100 - Site Work
Section 022000 - Earthwork
Construction Drawings

REFERENCE STANDARDS:

The latest edition or revision of the following reference documents shall apply. Where specifications and reference documents conflict, the specifications shall govern.

1. ASTM
 - a) C 33 Specification for Concrete Aggregates
 - b) C 90 Hollow Load Bearing Masonry Units
 - c) C 140 Methods of Sampling and Testing Concrete Masonry Units
 - d) C 145 Solid Load Bearing Concrete Masonry Units
 - e) C 150 Specification for Portland Cement
 - f) C 595 Specification for Blended Hydraulic Cements
 - g) C 1262 Evaluating the Durability of Concrete Masonry Units and Concrete Masonry
 - h) C 1372 Specifications for Segmental Retaining Wall Units
 - i) D 1248 Specification for Corrugated Plastic Pipe
 - j) D 1557 Moisture Density Relationship for Soils, Modified Proctor Density Method
 - k) D 422 Gradation Analysis
 - l) D 4318 Atterberg Limits
 - m) D 4595 Tensile Properties of Geotextiles by the Wide Width Strip Method
 - n) D 4632 Tensile Properties of Geotextiles
 - o) D 5262 Tensile Creep Testing of Geosynthetics
 - p) D 698 Moisture Density Relationship for Soils, Standard Proctor Density Method
 - q) D 2166 Triaxial Shear Test
 - r) D 3034 Specification for Polyvinyl Chloride (PVC) Plastic Pipe
 - s) D 3080 Direct Shear Test

Mechanically Stabilized Earth Walls

- | | | |
|----|--------|---|
| t) | D 5262 | Unconfined Tension Creep of Geosynthetics |
| u) | D 5321 | Coefficient of Soil and Geosynthetic |
| v) | G 51 | Alkalinity |
| w) | G 57 | Resistivity |
2. American Association of State Highway and Transportation Officials (AASHTO)
 - a) AASHTO Standard Specification for Highway Bridges
 - b) AASHTO T-27 Test Method for Gradation Limits – Fine Filter Material
 3. Federal Highway Administration (FHWA)
 - a) Mechanically Stabilized Earth Walls and Reinforced Soil Slope Design and Construction Guidelines (FHWA NHI-00-043, March 2001)
 - b) Design of Mechanically Stabilized Earth Walls and Reinforced Slopes - Volume I (FHWA NHI-10-024, November 2009)
 - c) Design of Mechanically Stabilized Earth Walls and Reinforced Slopes - Volume II (FHWA NHI-10-025, November 2009)
 4. Geo-synthetic Research Institute (GRI)
 - a) GG1 Standard Test Method for Geosynthetic Rib Tensile Strength
 - b) GG2 Standard Test Method for Geosynthetic Junction Strength
 - c) GG4-91 Determination of Geosynthetic Long Tern Design Strength
 - d) GG5-91 Geosynthetic Pullout
 5. National Concrete Masonry Association (NCMA)
 - a) NCMA Design Manual for Segmental Retaining Walls (3rd Edition, 2010)
 - b) SRWU-1 Connection Strength of Segmental Retaining Wall Units and Geosynthetic
 - c) SRWU-2 Shear Strength between Segmental Retaining Wall Units
 - d) NCMA Segmental Retaining Walls Best Practices (2016)

DESIGN REQUIREMENTS:

Design of SRW's with geosynthetic-reinforcement shall conform to the minimum safety factors in this Specification.

1. Geosynthetic reinforcement shall be in accordance with FHWA NHI-00-043 Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines".

Design Requirements – Unless otherwise indicated below, the MSEW design shall be performed in compliance with the FHWA NHI-00-043 (2001) design method. Design submittals not meeting this design criteria or technical/administrative criteria as specified will be rejected in its entirety until complete compliance is achieved. Owner or owner's representative reserves all rights in determining compliance for plan approval and may reject any submittals.

Mechanically Stabilized Earth Walls

<u>Internal Stability</u>	<u>Minimum Factor of Safety</u>
Sliding.	1.5
Pullout.	1.5
Tensile Overstress.	1.5
Facing Connection (Break).	1.5
Facing Connection (Pullout).	1.5
Uncertainties.	1.5
<u>External Stability</u>	<u>Minimum Factor of Safety</u>
Base Sliding.	1.5
Overturning.	2.0
Bearing Capacity.	2.0
<u>Global Stability</u>	<u>Minimum Factor of Safety</u>
Global External (Bishop).	1.5
Compound Internal (Bishop).	1.5
Translational 2-Part Wedge (Spencer).	1.5
Global External 3-Part Wedge (Spencer).	1.5

In addition the MSE wall design shall:

1. Address hydrostatic (groundwater seepage), seismic, rapid draw down, surcharge and backfill slope loading as shown on the site grading and drainage plans. A minimum live load of 250-psf shall be used for all walls supporting areas subject to traffic.
2. Seismic analyses must be performed if the project is located in a seismic impact zone, i.e., a horizontal acceleration coefficient greater than or equal to 0.1g. Seismic factors of safety to be 75% of the minimum static factors of safety.
3. Provide a minimum reinforcement length of 70% the total height of the wall, H_w , for cross sections with no toe or crest slopes, i.e., $L=0.7H_w$.
4. Wall sections with a toe slope, crest slope or both crest and toe slope shall provide a minimum reinforcement length of 70% the total height of the wall, H_w , plus height of slope(s), H_s , i.e. $L=0.7(H_w + H_s)$.
5. Provide 100% geosynthetic coverage (no gaps).
6. The maximum spacing between vertically adjacent reinforcing layers shall not exceed two 8-inch blocks “or” $S_v=16$ -inches (whichever is less). The maximum spacing between vertically adjacent reinforcing layers shall not exceed a single 18-inch block “or” $S_v=18$ -inches for large segmental blocks.
7. Filter fabric shall be placed to separate drainage stone from the reinforced soil.

8. Detail and address storm and utility line installations required within reinforced zone.
9. Detail and fully address footing installations for required automotive guardrails, fencing, light poles and other site improvements within the reinforced zone.

Soil design parameters shall be as provided in the construction documents. The wall Design Engineer of Record shall be responsible for selecting and specifying reinforced fill material. Reinforced and retained fill material shall have a minimum angle of internal friction of 30-degrees. Contractor is responsible for ensuring and documenting the reinforced fill meets the specified parameters for both strength and compaction.

SUBMITTALS:

The SRW contractor shall provide to the Owner and Architect a minimum of 14-days prior to the anticipated start date for the SRW a submittal package including the following:

1. A set of detailed SRW design plans sealed by a registered professional engineer licensed in the State of Georgia. The professional engineer shall have a minimum of five (5) years of experience in designing retaining wall systems of similar type and size to that which is being proposed. The SRW plans shall include all details, dimensions, quantities and cross sections necessary to construct the SRW and shall include:
 - a) Plan, elevation and cross section views for each wall,
 - b) Details for cap blocks, coping, or barriers constructed as part of the wall contract,
 - c) Construction specifications, and
 - d) Computer generated outputs demonstrating compliance with this Specification must be provided.
 - i. The computer program MSEW (v3.0) based on FHWA NHI-00-043 is acceptable. Detailed hand calculations demonstrating compliance with this Specification must be submitted if no computer program is used for design.
 - ii. The FHWA method based on NHI-00-043 and AASHTO 98/Demo 82 are the same with respect to external stability and internal stability. The difference between NHI-00-043 and AASHTO 98/Demo 82 is related to connection analyses as follows:
 - > AASHTO 98/Demo 82 (ASD) is based on *short-term connection tests*, which are commonly done at most testing labs.
 - > NHI-043 (ASD) is based on *long-term creep connection tests*. NHI-043 (ASD) method is applicable only if a creep connection test is performed.
 - > If a creep connection test has not been performed, then AASHTO 98/Demo 82 (ASD) must be used for the connection analysis.
 - iii. Overall stability calculations with respect to global external, compound internal and translation stability can be determined using the following computer program: ReSSA (v3.0).

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2. Proprietary product literature indicating which Segmental Retaining Wall (SRW) units and soil reinforcement are proposed for use on the project including color, face style and texture. Architect or Owner shall select color, face style, and texture.
3. Documentation for the SRW units and soil reinforcement demonstrating compliance with the requirements of this specification including but not limited to SRW compressive strength, absorption and durability; SRW/geosynthetic reinforcement connection and block shear capacity; geosynthetic reinforcement coefficients for direct sliding and interaction; and geosynthetic reinforcement reduction factors for creep, durability, installation damage and pullout.
4. Manufacturer's certification that SRW units meet the requirements of this specification.
5. Manufacturer's certification that the geosynthetic reinforcement meets the requirements of this specification.
6. Mechanically Stabilized Earth Wall system engineer's certification that the design complies with this specification and documented proof of current professional and general liability insurance with an aggregate coverage of not less than \$1,000,000.
7. Contractor's certification that
 - a) The specific SRW system proposed for use on this project has been successfully used on a minimum of ten (10) similar projects and has been successfully installed on a minimum of 1,000,000 square feet of retaining walls.
 - b) The contractor has a minimum of 1,000,000 square feet of experience within the previous five (5) years with the proposed SRW system. Contact names and telephone numbers shall be listed for projects used to document the 1,000,000 square feet.
8. Contractor shall be responsible for providing all required permits for the MSE wall.

DELIVERY, STORAGE AND HANDLING:

Contractor shall check the concrete masonry units upon delivery to assure that the specified type; grade, texture, color have been received. Contractor shall prevent excessive mud, wet concrete, epoxies, and like material, which may affix them selves from coming in contact with the concrete masonry units. Damaged materials shall not be incorporated into the MSEW system.

Check the soil reinforcement upon delivery to assure the proper grade and type of material been received. Provide a product certification with each shipment. Store geosynthetic reinforcement in accordance with the manufacturer's recommendations.

Store plastic pipe in accordance with the manufacturer's recommendations to prevent deleterious materials from becoming affixed. Store drainage aggregate to prevent contamination with other materials.

PART 2 – PRODUCTSDEFINITIONS:

Segmental Concrete Units – concrete masonry units shall be machine made from Type I, Type II or Type III Portland cement, water and mineral aggregates in accordance with ASTM C150. Concrete masonry units shall have a minimum 28-day compressive strength of 3,000-psi on the net area and have a maximum absorption rate of 8.0 percent.

Geosynthetic Reinforcement – structural geogrid or geotextile reinforcement formed by a regular network of integrally connected tensile elements with apertures of sufficient size to allow interlocking with surrounding soil, rock or earth and function as reinforcement. Soil reinforcement shall be specifically manufactured for soil reinforcement.

Unit Fill – drainage aggregate placed within and behind the segmental retaining wall (SRW) units.

Reinforced Backfill – compacted soil within the reinforced soil volume as shown on the plans.

Retained Soil – compacted imported or in-situ soil behind reinforced zone of the retaining wall.

Foundation Soil – compacted imported or in-situ soil beneath entire wall.

Leveling Pad – level compacted gravel or unreinforced concrete footing upon which first course of segmental concrete facing units are placed.

SEGMENTAL CONCRETE UNITS SHALL MEET THE FOLLOWING REQUIREMENTS:

- A. Manufactured in accordance with ASTM C1372.
- B. Minimum 28-day compressive strength of 3000-psi.
- C. Maximum moisture absorption of 8%.
- D. Pass ASTM C1262 using a water solution. The criteria for passing the test is 100 cycles with less than 1% loss in 5 of 5 samples or 150 cycles with less than 1/5% loss in 4 of 5 samples.
- E. Dimensional tolerances shall be within +/-1/8 inch from published standard on overall vertical dimensions, but shall not vary more than +/-1/16 inch as measured from the lowest to highest point across the top surface of the unit from a level base plane.
- F. Modular units shall provide an in-place weight of 100-pcf to 120-pcf including the unit fill (vertical core systems only), which is contained within the nominal dimension of the unit.
- G. Units shall have angled sides capable of concave and convex alignment curves with a minimum radius of 3.5-feet.

- H. Minimum inter-unit shear strength of 500-lbs/ft at 2-psi normal pressure per NCMA SRWU-2.
- I. Minimum geosynthetic to SRW unit peak connection strength of 500-lbs/ft at 2-psi normal pressure per NCMA SRWU-1.
- J. The wall supplier shall demonstrate by laboratory testing and engineering calculations that the strength of the connection between geosynthetic reinforcement and segmental concrete block units is capable of meeting or exceeding the maximum tensile force within a given geosynthetic reinforcement layer with a minimum Factor of Safety of 1.5.
- K. SRW units exposed faces shall be free of chips, cracks or other imperfections when viewed from a distance of 10-feet under diffused lighting.

SOIL REINFORCEMENT:

- A. Geosynthetic Reinforcement – The geosynthetic shall be evaluated in accordance with FHWA NHI-00-043 where:

$$T_{\text{Allowable}} = \frac{T_{\text{Ultimate}}}{RF \times FS} = \frac{T_{\text{Ultimate}}}{RF_{CR} \times RF_{ID} \times RF_D \times FS}$$

- B. Tult shall be the minimum average roll value (MARV) ultimate tensile strength per ASTM D4595.
- C. RFcr, Creep Reduction Factor shall be determined in accordance with FHWA NHI-00-043 Appendix B with results extrapolated for a 75-year design life. A minimum of one 10,000-hour creep tension test per ASTM D5262 is required to determine RFcr. Short term testing by itself is insufficient.
- D. RFid, Installation Damage reduction factor, shall be determined from construction damage tests for each product proposed for use with project specific, representative or more severe backfill and construction techniques. The backfill soil used, if other than project specific, shall have a D50>0.6mm (No. 30 sieve). Testing shall be consistent with ASTM D5818. Default RFid value of 3.0 shall be used if such testing has not been conducted. The minimum RFid shall be 1.10.
- E. RFd, Durability reduction factor, is the combined partial factor for potential chemical and biological degradation. A default RFd of 2.0 shall be used if durability testing has not been conducted. The minimum RFd shall be as follows:
1. HDPE..... 1.1
 2. PET. 1.1

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- F. Direct Sliding Coefficient, C_{ds} value shall be determined from pullout tests per GRI:GS-6. The maximum pullout force used to determine C_{ds} shall be limited to the lesser of T_a or the force that yields 1.5 inches displacement. The minimum C_{ds} value shall not be greater than 1.0 where the C_{ds} value is determined follows:

$$C_{ds} = \frac{F}{L \sigma_N \tan \phi} \quad \text{Where}$$

- F = Maximum shear resistance from direct shear test (lb/ft), per GRI:GS-6
 L = Geosynthetic Embedment Length in Test (ft)
 σ_N = Effective Normal Stress (psf) at range from 500 to 1000 psf
 ϕ = Effective Soil Friction Angle, Degrees

- G. Soil/Geosynthetic Interaction Coefficient, C_i value shall be determined from pullout tests per GRI:GG-5. The maximum pullout force used to determine C_i shall be limited to the lesser of T_a or the force that yields 1.5 inches displacement. The minimum C_i value in silty-Sand shall be 0.9 where the C_i value is determined follows:

$$C_i = \frac{F}{2 L e \sigma_N \tan \phi'} \quad \text{Where}$$

- F = Pullout force (lb/ft), per GRI:GG-5
 $L e$ = Geosynthetic Embedment Length in the Anchorage Zone in Test (ft)
 σ_N = Effective Normal Stress (psf) at range from 500 to 1,000 psf
 ϕ' = Effective Soil Friction Angle, Degrees

- H. The following additional requirements shall apply.

1. Geogrid shall have a minimum junction strength of 40-pounds per foot per GRI:GG2. If this criterion is not met then the geogrid shall have a minimum mass of 8 oz/sy and meet the strength requirements of AASHTO M-288-96 Class 1 geotextile.
2. All geogrids shall have a minimum stiffness (flexural rigidity) of 30,000 mg-cm per ASTM D1388. If this criterion is not met then the geogrid shall be staked during placement.
3. PET geogrids shall be coated with a suitable coating immutably bonded to PET bundles. The coating shall contain a minimum of 1% carbon black measured per ASTM 4218. If this criterion is not met then the minimum Rfd shall be 1.6.
4. PET geosynthetics shall possess a Molecular Weight greater than or equal to 25,000 grams/mole as per GRI:GG8 and a carboxyl end group number less than or equal to 30 as per GRI:GG7. PET geosynthetics not meeting this criteria shall use a minimum Rfd=2.0.
5. HDPE geogrids shall possess a melt flow index value greater than or equal to 0.88. HDPE geogrids not meeting this criteria shall use a minimum Rfd=2.0.

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- I. Manufacturing Quality Control – The purpose of the QC testing program is to verify that the proposed geosynthetic being supplied to the project is representative of the geosynthetic used for all performance testing described above. The geosynthetic manufacturer shall have a manufacturing quality control program that includes QC testing no less frequently than each 400,000 sf of production. All QC testing shall be performed by an independent GAI-LAP facility. The testing as a minimum shall include Tensile Strength per ASTM D4595.
- J. Reinforcement shall have National Transportation Product Evaluation Program (NTPEP) approval, for manufacturers go to <http://data.ntpep.org/Search/AdvanceSearch.aspx>.

UNIT FILL:

- A. Shall consist of clean 1” minus crushed stone or crushed gravel meeting the following gradation per ASTM D422.

<u>Sieve Size</u>	<u>Percent Passing</u>
1 inch	100
¾-inch	75-100
No. 4	0-10
No. 40	0-5

- B. Segmental block systems which rely on friction with respect to connection capacity must use unit fill (typically #57 stone) within vertically oriented cores and 12-inches behind the proposed block units, a minimum of 1.0-cubic foot of unit fill shall be used for each square foot of wall face.
- C. Filter fabric must be placed between the unit fill and reinforced soils to minimize migration of fine soil particles into the unit fill.
- D. Drainage collection pipe shall be 4-inch perforated/slotted schedule 40 PVC or corrugated HDPE pipe. The pipe may be covered with a knitted or non-woven geotextile sock to function as a filter. Drainage pipe shall be manufactured in accordance with ASTM D3034 or ASTM D1248.
- E. Collector drain located at the backside of the reinforced zone shall be constructed using drainage aggregate wrapped in a geotextile filter fabric. The minimum dimension of the collector drain shall be 3.0-feet wide by 1.0-foot high. If groundwater is within 0.66H of the bottom of wall a blanket drain will be required in place of the collector drain.

REINFORCED BACKFILL:

- A. Fill material used to construct the soil reinforced and retained zones (where applicable) shall consist of one of the following inorganic soil types according to their USCS designations (GP, GW, SW, SP, SM). The fill material must also meet the gradation below and the strength requirements noted below. Maximum particle size to be ¾-inches.

<u>Sieve Size</u>	<u>Percent Passing</u>
¾-inch	75-100
No. 4	20-100
No. 40	0-60
No. 200	0-35

1. Less than 35% passing the No. 200 sieve per ASTM D422.
 2. Materials passing the No. 40 sieve should have a liquid limit less than 30 and a plasticity index less than 6 as per ASTM D4318.
 3. An effective internal angle of friction greater than or equal to 30-degrees per ASTM D2166 or D3080 at the compaction standard.
 4. The reinforced fill material shall have a maximum dry unit weight greater than or equal to 100-pcf as determined by standard Proctor (ASTM D 698).
 5. Fill containing brush, sod, peat, roots, or other organic, perishable, or deleterious matter including, but not limited to snow, ice, or frozen soils, shall be considered unsuitable material and shall be removed. Less than 0.5% organic material.
- B. Use of an effective friction angle greater than 30-degrees for design shall be verified by appropriate testing submitted to and approved by the Owners engineer prior to construction.
- C. The pH of the backfill soil shall be between 5 and 8 when tested in accordance with ASTM G51.

PART 3 - EXECUTIONPREPARATION AND EXCAVATION:

Include all means of subsurface improvement as required.

Comply with all state and local requirements for execution of the work, including local building codes and current OSHA excavation regulations. The General Contractor is responsible for stability of the area during excavation and wall construction. Any excavation support required to maintain/protect existing structures, utilities, landscape features or property shall be the responsibility of the General Contractor.

Prior to undertaking any grading or excavation of the site, confirm the location of the retaining walls and all underground features, including utility locations within the area of construction. Ensure surrounding structures are protected from effects of wall excavation.

Coordinate installation of underground utilities with wall installation.

Control surface water drainage and prevent inundation of the MSE wall area during construction.

Contractor shall excavate to the lines and grades shown on the construction drawings. Owner's representative shall inspect the excavation and approve prior to placement of leveling material or fill soils. Proofroll foundation area and perform on-site bearing capacity tests as directed to determine if foundation improvement is required.

Before construction of the reinforced wall, the contractor shall clear and grub the fill zone area removing topsoil, brush, sod, organics, or other deleterious materials. Any unsuitable soils shall be over-excavated and replaced before placing additional fill soils.

Over-excavation and replacement of unsuitable foundation soils and replacement with approved compacted fill will be compensated as agreed upon with the Owner.

Foundation bearing capacity shall be inspected by a local geotechnical testing company. The engineer shall confirm with a field inspection that the foundation has been properly prepared and the bearing capacity requirements are appropriate before placement of the geosynthetic reinforced zone.

Required Bearing Capacity (psf) > 3,000 psf "or"	=	Level Backfill:	$q = \gamma H * 1.3$
	=	2H:1V Backfill:	$q = \gamma H * 1.6$

A pre-construction meeting shall be conducted by the General Contractor prior to beginning construction on segmental retaining walls. Owner and Architect shall be notified of the date, time, and location of the meeting. Mandatory attendees include the General Contractor, the wall design engineer of record, the project geotechnical engineer, the Contractor's testing agency, Owner's independent testing laboratory, and representatives of all sub-contractors involved with the foundation preparation, erection, and backfilling of the MSE wall. Meeting topics shall include, but are not limited to contractor qualifications as stated above; schedule and phasing of wall construction; coordination with other on-site construction activities; responsibilities of parties; and sources, quality, and acceptance of materials. Location and coordination of backfill soil sources for the retaining wall must be discussed and acknowledged prior to any site grading. If contractor fails to protect and utilize soils designated as suitable backfill for MSE walls contractor will be responsible for providing appropriate suitable backfill at their expense and at no additional cost to owner.

BASE LEVELING PAD:

Leveling pad material shall be placed to the lines and grades shown on the construction drawings, to a minimum thickness of 6-inches and extend laterally a minimum of 6-inches in front and behind the concrete masonry unit.

Leveling pad materials to be compacted to a minimum 95% Standard Proctor density per ASTM D-698.

Leveling pad shall be prepared to insure full contact to the base surface of the SRW units.

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First course of units shall be placed on the leveling pad at the appropriate line and grade. Alignment and level shall be checked in all directions and insure that all units are in full contact with the base and properly seated.

SRW UNIT INSTALLATION:

Place the front of unit's side-by-side. Do not leave gaps between adjacent units. Layout of corners and curves shall be in accordance with manufacturer's recommendations.

Install mechanical shear/connecting devices per manufacturer's recommendation.

Place and compact drainage fill within (frictional systems with vertically oriented cores) and behind wall units (all SRW systems). Place and compact backfill soil behind drainage fill. Follow wall erection and drainage fill closely with structure backfill.

Maximum-stacked vertical height of wall units, prior to unit drainage fill and backfill placement and compaction, shall not exceed two courses or 16-inches whichever is less.

GEOSYNTHETIC INSTALLATION:

Geosynthetic reinforcement shall be oriented with the highest strength axis (machine direction) perpendicular to the wall alignment. Contractor shall verify correct orientation.

Reinforced fill zone length is measured from the backside of the masonry block units unless otherwise noted on drawings.

Geosynthetic reinforcement shall be continuous throughout embedment lengths and placed side-by-side to provide 100% coverage at each level. Spliced connections between shorter pieces of geosynthetic or gaps between adjacent pieces of geosynthetic are not permitted.

Before placing fill, the geosynthetic materials shall be placed to lay flat, or slightly sloping downward away from the wall face on compacted backfill and mechanically attached to the masonry block units. Place the next course of masonry block units over the geosynthetic. The geosynthetic shall be pulled taut to remove any slack in the geosynthetics, and anchored prior to backfill placement on the geosynthetic.

Tracked construction equipment shall not be operated directly on the geosynthetic reinforcement. A minimum fill thickness of 6 inches is required for operation of tracked vehicles over the geosynthetic reinforcement. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and the geosynthetic reinforcement.

Rubber-tired vehicles may pass over the geosynthetic reinforcement at slow speeds, less than 10-mph. Sudden braking and sharp turning shall be avoided.

Geosynthetic reinforcement shall be cut next to the cross machine direction (CMD) apertures. Cross machine direction apertures shall be placed along the front face of the MSE wall.

REINFORCED BACKFILL PLACEMENT:

Construct wall in location and to top and bottom elevations shown on grading plans.

Reinforced backfill shall be placed, spread, and compacted in such a manner that minimizes the development of slack in the geosynthetic and installation damage. Reinforced backfill materials shall be placed from the wall face back toward the ends of the geosynthetic to ensure further tensioning of the reinforcement.

Reinforced backfill shall be placed and compacted in lifts not to exceed 6-inches where hand compaction is used, or 8-inches where heavy compaction equipment is used. Lift thickness shall be decreased to achieve the required density as required.

Reinforced backfill shall be compacted to 95% of the maximum density as determined by ASTM D698. The moisture content of the backfill material prior to and during compaction shall be uniformly distributed throughout each layer and shall be within a range of 2% below to 2% above optimum moisture content.

Fill shall be placed in horizontal layers not exceeding 6-inches in uncompacted thickness for zones where compaction is accomplished with hand-operated equipment. Only lightweight hand-operated equipment shall be allowed within 4-feet from the face of the SRW unit.

The infill soil shall be compacted in maximum 8-inch compacted lifts to the following minimum densities (percentage of the maximum standard Proctor ASTM D698):

1. fine grained (SM) soils to a minimum of 95 percent Standard Proctor within -2/+2 percent of optimum moisture content, whichever is greater; and
2. coarse grained (GP, GW, SW, SP) soils to a minimum of 95 percent Standard Proctor.

Testing methods and frequency, and verification of material specifications and compaction shall be the responsibility of the project geotechnical engineer.

Wall including reinforced mass shall be constructed on foundation soils having a minimum internal friction angle of 30-degrees to a minimum depth of one third (1/3) the wall height or a net allowable bearing pressure as stated in Section 3.1.I.

Reinforced fill shall be compacted to the top of each row of masonry block units prior to the placement of the next row of masonry block units.

SRW units shall be placed not more than 2-courses or 16-inch above level backfill.

Contractor shall have an approved set of plans and specifications on site at all times during construction of the wall.

RETAINED BACKFILL PLACEMENT:

Retained backfill shall be compacted to a minimum 95 percent Standard Proctor density (ASTM D698) in landscape areas. Retained backfill located in the upper two feet below crest slopes or pavement structures shall be compacted to a minimum 98 percent Standard Proctor density or to the density recommended by the project geotechnical engineer.

CAP INSTALLATION:

If applicable, cap units shall be permanently secured to the masonry block units using an approved construction adhesive conforming to ASTM 2339.

The general contractor shall verify the in-place top of wall elevation before installing the top units. Top units may require shifting to comply with the design elevations.

Incorporate surface water drainage control (swale) into the finished grade at top of wall, as shown on the civil engineers grading and drainage plan, where applicable.

AS-BUILT CONSTRUCTION TOLERANCES:

Vertical alignment: ± 1.25 -inch over any 10.0-foot distance.

Wall Batter: Must be within 2.0-degrees of design batter.

Horizontal alignment: ± 1.5 -inch over any 10.0-foot distance and in corners, bends and curves ± 1.0 -foot of the theoretical location.

Maximum horizontal gap between erected units shall be 1/8-inch.

FIELD QUALITY CONTROL:

The Owner shall engage inspection and testing services, including independent laboratories, to provide quality assurance and testing services during construction. As a minimum, quality assurance testing should include foundations soil inspection, soil and backfill testing, verification of design parameters, and observation of construction for general compliance with design drawings and specifications. This does not relieve the Contractor from securing the necessary construction quality control testing during construction.

Quality control testing and inspections services shall only be performed by qualified soil technicians and geotechnical engineers.

Quality control testing, as a minimum shall include:

1. Special inspector shall verify / document each of the following:
 - a. Correct reinforcement type, elevation, length, orientation, reinforcement tensioning procedures, placement of drainage materials and outlets to be observed by the project geotechnical engineer.
 - b. Verification of entire foundation (entire reinforcement length, L) must be observed by the project geotechnical engineer.
 - c. Field location in plan and elevation, wall batter to be observed by the project surveyor.
2. Reinforced Soil Testing
 - a. Every new soil type and/or every 2,000 cy run pH, Atterberg Limits, Sieve Analysis, Proctor new soil type per geotechnical field personnel.
 - b. Triaxial Test on every appreciable different soil type based on index testing.
 - c. Run Consolidated-Undrained Triaxial Shear Tests and report the stress strain test results as well as present the Mohr-Coulomb failure diagram for peak and residual stress levels, as required by ASTM. The geotechnical consultant will provide a recommended effective internal friction angle based on their results.
 - d. Run compaction tests as follows:
 - i. Every two-foot change in height and interval of 100-feet of Wall length.
 - ii. Run 4 compaction tests one within 4-feet of face, and three others randomly throughout the reinforced soil zone.
3. Retained Soils Testing:
 - a. Every new soil type and/or every 2,500-cy run Atterberg Limits, Sieve Analysis, Proctor per Geotech Field Personnel and if different from Reinforced Soil.
 - b. Cohesion in the retained soil should not be used in design even if the failure envelope determined from shear tests indicates that such value temporarily exists.
 - c. Run compaction tests as follows:
 - i. Every two-foot change in height and interval of 200-feet of Wall length.
 - ii. Run 3 compaction tests one within 3-feet of reinforced zone and two others randomly throughout the retained soil zone.
4. Foundation Soils Testing
 - a. Strength testing at time of design. Generally, one in the worst area would suffice.
 - b. IF foundation fill is required, treat as if it were reinforced soil fill, those criteria apply.
 - c. Verify foundation bearing capacity by probe rod and static cone penetrometer testing every 10-feet of wall length for entire Reinforced soil zone. Also use hand auger borings to a depth of 12-feet or the reinforcement length whichever is shorter, every 30-feet along the wall length at third points of the reinforcement length.
 - d. For walls in excess of 20-feet tall, power auger holes with cone or SPT testing to depth equal to twice the wall height is required, every 50-feet of wall length or as required by the geotech to establish appropriate allowable bearing capacity, unless already performed in pre-Wall design geotechnical investigation. If there is soft soil, it should be done to the bottom of the soft soil layer.

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5. Please note that the special inspector must notify the contractor of out-of-tolerance work. The inspector cannot observe or test and let out-of-spec work be covered. With all of the parameters established in the MSE wall specifications and the guidelines for testing frequency outlined above the geotechnical engineer can perform their role within those parameters.
6. The MSE wall shall be staked in the field and located as per the civil grading plan by a registered Georgia Surveyor. Stakes shall be placed on 25-foot intervals so as to identify location along the wall alignment with respect to geogrid placement and soil compaction tests.

PART 4 - CHANGES TO GEOSYNTHETIC REINFORCEMENT LAYOUT AND PLACEMENT

No changes to the masonry block or geosynthetic reinforcement layout, including but not limited to, length, geosynthetic type, or elevation shall be made without the expressed prior written consent of the wall design engineer-of-record.

PART 5 - SITE DRAINAGE

Backfill shall be graded a minimum of 2-percent away from the wall face and rolled at the end of each work day to prevent ponding of water on the surface of the reinforced soil mass. A berm at the crest of the wall shall be constructed at the end of each workday to prevent rainwater from overtopping the wall. The Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

Care shall be taken not to contaminate the filter fabric, unit fill, blanket drains, chimney drains and/or the drainage composite with poor drainage material such as fine grained silt and clay.

Drainage aggregate shall extend one foot behind the back of the masonry block units to alleviate the build up of possible hydrostatic pressure behind the masonry block units.

The engineering, design, analysis, detailing and mitigation of surface water control related to the MSE wall shall be the responsibility of the project civil engineer.

The engineering, design, analysis, detailing and mitigation of groundwater seepage shall be the collective responsibility of the project geotechnical engineer and MSE wall engineer.

PART 6 - GENERAL CONSTRUCTION NOTES

Construction shall conform to all state and local and manufacturers' requirements.

General or grading contractor is responsible for location and protection of underground utilities in the vicinity of the wall and for maintaining safe excavations and working conditions.

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All utilities located within the reinforced zone are to be installed concurrently with the reinforced backfill placement.

All liquid carrying utilities located within the reinforced backfill are to be encased in a drainage aggregate and geotextile filter. All liquid carrying utilities located outside of, but within 100-feet of the reinforced backfill shall be water tight to prevent migration of water into the surrounding soils.

Wall elevation views and locations and geometry of existing structures must be verified by the owner or owner's representative prior to construction.

Backfill and compact in front of wall prior to exceeding 5.0-feet of wall height.

A copy of the design report and the wall drawings should be provided to future owners of the developed property to provide them with a record of the location of the reinforced zone and recommendations regarding permissible construction activities.

Contractor shall provide Owner with written recommended maintenance and inspections requirements.

PART 7 - CLOSEOUT DOCUMENTS

At the end of construction, the MSE wall contractor shall provide a letter to the owner indicating the MSE wall(s) have been constructed in accordance with the approved MSE wall drawings and MSE wall specifications.

At the end of construction, the geotechnical testing agency shall provide a letter to the owner indicating soils used to construct the MSE wall(s) have been tested and approved in accordance with the MSE wall specifications.

End of Section 022760

SECTION 022800 - TERMITE CONTROLPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Provide soil treatment for termite control, as herein specified.

GENERAL JOB REQUIREMENTS:

All termite treatment for Gwinnett County School projects shall be performed by a treatment company selected by the Owner through competitive pricing agreements. Gwinnett County Board of Education shall contract with this company to supply and provide termite treatment on each project requiring this work. The Owner has obtained through competitive bidding the source for Termite Control Treatment for this project.

The Contractor shall engage Allgood Services of Georgia, 240 Lawrenceville Highway, Lawrenceville, Georgia 30044 or P.O. Box 465598, Lawrenceville, Georgia 30042, Gerald Johnson (770) 339-4500, to apply termiticides.

The treatment company shall prepare a bid for the project using the agreed upon pricing, and shall submit his bid to all the bidding general contractors. The General Contractor shall include in his Base Bid the total cost of all termite control treatment including his overhead and profit.

As stipulated by the Georgia Structural Pest Control Act, the pest control company selected to perform termiticide work must enter into a written, signed contract with the appropriate builder/contractor. Pest Control companies doing business on Gwinnett County Schools' property must comply with this requirement and be provided a copy of that section of these specifications that relate to soil treatment for termite control.

The General Building Contractor must enter into a written contract with the pest control company for subterranean termite pretreatment services as required by the Georgia Rules of the Structural Pest Control Act.

The General Contractor for the construction of this project shall coordinate fully with the Owner's selected treatment company throughout the construction phase of the project, just as he would any of his other sub-contractors on the project.

The specifications that follow were used by the Owner in the Termite Treatment bidding procedures and are included here as a reference for this project. The General Contractor shall be responsible for scheduling the the pest control Sub Contractor's treatment applications.

SUBMITTALS:

Submit data indicating chemical formulations to be used including specimen labels with installation instructions.

Submit sample guarantee and bond.

GENERAL JOB REQUIREMENTS:

All pesticides must be applied in accordance with the pesticide manufacturer's label and labeling specifications and recommendations for all pesticides used and work performed including preparation of substrate, as specified, unless otherwise indicated herein. Furthermore, comply with all rules and regulations as set forth under Georgia Law, and enforced by the Georgia Department of Agriculture Structural Pest Control Commission governing termiticide applications.

Pest Control Services shall be provided by a company as selected by the Owner. General Contractor shall contract directly with the Owner selected Pest Control Company.

The general building contractor must enter into a written contract with the pest control company, as required by the Georgia Rules of the Structural Pest Control Act, for subterranean termite pre-construction treatment services, as specified. Payment will be made to the pest control company by the general contractor in accordance with the terms of the agreement between the pest control company and the building general contractor.

Engage a professional pest control operator, licensed in accordance with regulations of governing authorities for applying termiticides as a soil treatment solution. Termiticide applicators must comply with all safety requirements of the pesticide manufacturer.

JOB CONDITIONS AND RESTRICTIONS:

Do not apply termiticides to frozen or excessively wet soils or during inclement weather. Termiticides must not be applied until excavating, filling and grading operations are completed. Only clean fill dirt shall be used to fill or level low lying substrate areas. Bricks, rocks, insulation and cellulose type materials such as scrap wood, paper products and composition products shall not be used as fill material in areas to be covered by concrete slabs or other building components. All buried logs, stumps and other wood objects must be removed from areas to be covered by buildings and building components, such as sidewalks, driveways and paved areas, that are adjacent to buildings.

After the termiticide has been applied, no further excavating, filling, grading or other soil disturbance, is permitted unless the added or disturbed soil is treated as stipulated by these specifications.

Insulating materials must not be laid or applied on the soil along inside perimeter walls until the soil pretreatment application is completed.

When feasible, termiticide shall be applied in all areas prior to covering by buildings and building components, such as sidewalks, driveways and paved areas that are adjacent to buildings, to avoid unnecessary drilling for termiticide application.

PRODUCT AND SERVICE WARRANTY:

The Contractor must provide a written, one (1) year re-treatment guarantee against the infestation of subterranean termites. The guarantee must specifically state that if a subterranean termite infestation is discovered during the guarantee period, the Pest Control Contractor will eliminate the termite infestation by properly treating the infested and adjacent areas within 30 days of notification by the Owner's Representative. All re-treatments must be done at no expense to the Gwinnett County Public School System. All premium and re-inspection costs for the initial one (1) year period shall be included in the Pest Control Contractor's prices.

QUALITY ASSURANCE:

Do not apply termiticides until excavating, filling and grading operations are completed. The Contractor shall notify, by telephone, the Gwinnett County Public Schools Construction Coordinator and Architect not less than 24 hours prior to the planned soil treatment by the pest control operator contracted to perform said treatment. Prior to treatment, said coordinator shall have the opportunity to observe the site to insure that all cellulose debris has been removed from the foundation trenches, sub-slab fill areas and plumbing access points. All termite treatment shall be done during normal working hours unless approved otherwise, in advance, by the Owner's Construction Coordinator.

Failure to follow contract requirements shall result in the placement of a complete post-construction, subterranean termite treatment to be performed as specified in the rules and regulations of the Georgia Structural Pest Control Act and paid by the Contractor.

The Gwinnett County Public School System reserves the right to collect soil samples and test concentrates of termiticides used, utilizing the State of Georgia Enforcement Agency or other government agencies or commercial companies as deemed appropriate and as determined by the Gwinnett County Public School System.

All empty termiticide containers will be thoroughly triple-rinsed, sealed in large bags labeled "termiticide" and left at a designated location at the job site. Under no condition will empty termiticide containers or packages be brought into or removed from the construction site.

PART 2 - PRODUCTS

SOIL TREATMENT SOLUTIONS:

Subterranean Termite Pre-Construction Treatment:

Inside and including perimeter walls use only termiticide concentrates with a current E.P.A. label approved for pre-treatment of new construction with Imidacloprid as the active ingredient. Termiticide must be mixed per label instructions and applied at a finished concentrate of 0.05% of the active ingredient by weight.

Outside perimeter walls use only termiticide concentrates with a current E.P.A. label approved for pre-treatment of new construction with Fipronil as the active ingredient. Termiticide must be mixed per label instructions and applied at a finished concentrate of 0.06% of the active ingredient by weight.

Subterranean Termite Post-Construction Treatment Including Spot Treatments:

Use only termiticide concentrates with a current E.P.A. label approved for post-construction treatment with Fipronil as the active ingredient. Termiticide must be mixed per label instructions and applied at a finished concentrate of 0.06% of the active ingredient by weight.

Solutions used for outside perimeter treatments must not be injurious to plants.

All termiticides must be poured into the termite tank and mixed at the construction site under the observation of a representative of the Gwinnett County Public School System. Mixing of dissimilar chemical products is prohibited.

PART 3 - EXECUTION

EQUIPMENT:

All termiticide application equipment, including vehicle and repair tools and parts, must be maintained in good and proper working condition at all times.

Each treating unit - vehicle, hose, etc., must be of sufficient size and capacity to properly apply, as a pre-treatment, 1,000 gallons of chemical within five (5) hours, including refill time. The equipment must have a minimum termiticide output, when applied as a coarse spray through 200 feet of hose, of seven (7) gallons per minute. This will generally require a pump of at least three (3) hp and hoses and connectors of at least $\frac{3}{8}$ " I.D.

Each treating unit must have a minimum tank capacity of 100 gallons and at least 300 feet of hose in segments not exceeding 100 feet each. All hose connections between the reel, hose segments, nozzle gun, etc., must be of the rapid connect/disconnect type.

Vehicles used for pre-treatment must be of sufficient size and power to properly maneuver, fully loaded, in typical construction sites with wet, clay soil.

The nozzle gun must be capable of producing a variable output pattern of solid stream to very coarse spray. The coarse spray pattern must have a minimum termiticide output of seven (7) gpm when applied through 200 feet of hose.

The pest control company must have "on-site" the necessary regulation equipment to refill from a fire hydrant. This includes a minimum of 25 feet of 2" diameter fire hose and regulation cut on/off wrenches.

Due to the fact that the Gwinnett County Department of Public Utilities will charge \$75.00 per day to meter water usage at a fire hydrant location, each bidder needs to understand that the bidders cost to the general contractor needs to include an allowance to cover county metering. The Pest Control Company is responsible for the estimated time to complete any given project.

The pest control contractor must have at least one back-up vehicle, properly equipped, available within two (2) hours for emergency use in the event of breakdown or malfunction of the regular designated equipment.

APPLICATIONS:

All treatments must be done strictly in accordance with the pesticide label and the Rules of the Structural Pest Control Act of the State of Georgia, unless otherwise specified.

Surface Preparation: Remove foreign matter which could decrease effectiveness of treatment on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and foundations.

PRE-CONSTRUCTION:

Slab-On-Ground:

Horizontal soil surfaces - Apply one (1) gallon per ten (10) square feet of 0.05% Imidacloprid termiticide solution to areas to be covered by concrete interior and attached slabs, to thoroughly saturate the soil surface. If fill under slab is gravel or other coarse aggregate, the specified application rate of one (1) gallon per ten (10) square feet of area is acceptable to the Owner as a minimum provided sufficient volume of solution is applied to accurately and uniformly cover ten (10) square feet, not to exceed the maximum label rate. If soil compaction, time considerations, or soil moisture conditions dictate, (as determined by the Gwinnett County Public Schools Construction Coordinator) 0.5 gallon of a 0.1% Imidacloprid termiticide solution per ten (10) square feet may be applied.

Apply two (2) gallons of termiticide per ten (10) linear feet to all open concrete blocks and other wall voids including perimeter and interior walls.

The soil around all potential critical points of entry must be thoroughly saturated. These areas include, but are not limited to, the soil along the inside of perimeter walls, around interior column footings, interior partition walls, around plumbing pipes, electrical conduits, and other structures that will penetrate the concrete slab.

Allow all termiticide to soak into the soil (no standing puddles) before covering soil with plastic, beginning concrete placement or other construction activities.

If structures are not completed or slabs are not poured the same day of treatment, such treated voids or soil shall be covered with polyethylene sheeting or other water impervious material until such areas are permanently covered.

Exterior Perimeter Walls:

Exterior perimeter walls will be treated after landscaping in the treatment zone is substantially complete, to prevent disturbance of the continuous treatment zone once established.

Apply four (4) gallons per ten (10) linear feet per one (1) foot of depth of 0.06% Fipronil termiticide solution to soil areas along the outside perimeter of foundation walls in accordance with the label. Application should be by trenching, or by trenching and rodding, and should be from the top of the soil to the top of the footing, not to exceed four (4) feet. If top of footing is exposed, treatment is to the lesser of one (1) foot of depth or the bottom of the footing.

Allow all termiticide to soak into the soil (no standing puddles) before covering soil with plastic, beginning concrete placement or other construction activities.

If structures are not completed or slabs are not poured the same day of treatment, such treated voids or soil shall be covered with polyethylene sheeting or other water impervious material until such areas are permanently covered.

Any area of the continuous treatment zone disturbed by the contractor's construction activities or by the contractor's failure to wait for substantial completion of landscaping activities in the treatment zone shall be retreated at the contractor's expense, to re-establish a continuous treatment zone.

POST-CONSTRUCTION:

Exterior Perimeter Walls:

Exposed Soil - Apply four (4) gallons per ten (10) linear feet per one (1) foot of depth of 0.06% Fipronil termiticide solution to soil areas along the outside perimeter of foundation walls in accordance with the label. Application should be made by trenching, or by trenching and rodding, and should be from the top of the soil to the top of the footing, not to exceed four (4) feet. If top of footing is exposed, treatment is to the lesser of one (1) foot of depth or the bottom of the footing.

Soil Under Adjacent Concrete Slabs - Apply four (4) gallons per ten (10) linear feet per one (1) foot of depth of 0.06% Fipronil termiticide solution to soil areas along the outside perimeter of foundation walls that are under concrete slabs adjacent to the wall in accordance with the label. Application should be by drilling and rodding and should be from the top of the soil to the top of the footing, not to exceed four (4) feet. If top of footing is exposed, treatment is to the lesser of one (1) foot of depth or the bottom of the footing.

Trenches must be at least six (6) inches deep, or to the bottom of the footing. When necessary and appropriate, the bottom of the trench will also be rodded at no more than 6 inch intervals and in a manner to assure that all soil along the foundation wall down to the building footings is thoroughly treated.

The soil from the trench will be used as backfill and thoroughly treated with termiticide.

Sidewalks, entryways and other concrete slabs adjacent to the outside perimeter of foundation walls must be drilled at intervals not to exceed twelve (12) inches. After treating, drilled holes must be plugged and filled with concrete.

Only the outside building wall foundations will be treated. The drilling and treating of wall voids is not required.

The pest control contractor must cover holly and other plants with spines or prickly leaves along exterior walls with tarps or other similar material to protect workers as appropriate.

The Pest Control Operator must post signs in accordance with the Rules of the Georgia Structural Pest Control Commission in areas of application to warn workers, school staff and students that termiticides will be or have been applied. Remove signs when areas are covered by other construction, unless required to remain in place longer by the Rules of the Georgia Structural Pest Control Commission.

Contamination of public and private water supplies must be avoided by taking such precautions as using anti-backflow equipment or procedures to prevent siphonage of pesticide back into water supplies.

PART 4 - INSURANCE REQUIREMENTS AND CONTRACTOR LIABILITYHAZARDS:

The pest control contractor shall be responsible from the time of his signing the Owner-Contractor Agreement, or from the time of the beginning of the first work, whichever shall be earlier, for all injury or damage of any kind resulting from the work to persons or property, regardless of who may be the owner of the property. In addition to the liability imposed upon the Contractor on account of bodily injury (including death), or property damage suffered through the Contractor's negligence, which liability is not impaired or otherwise affected hereby, the Contractor assumes the obligation to save the Owner harmless and to indemnify and defend the Owner from every claim, expense, liability or payment arising out of or through injury (including death) to any person or persons or damage to property (regardless of who may be the Owner of the property) of any place in which work is located arising out of or suffered through any act or omission of the Contractor or anyone either:

1. Directly or indirectly employed by, or
2. Under the supervision of any contractor in the prosecution of the work included in this agreement.

WORKER'S COMPENSATION INSURANCE FOR THE CONTRACTOR:

The Contractor agrees to comply with the provisions of the Worker's Compensation Laws of the State of Georgia. The Contractor agrees that, prior to the beginning of any work by the contractor, he (the Contractor) will furnish to the Owner a certificate from the insurance company showing issuance of Worker's Compensation coverage for the State of Georgia or a certificate from the State Worker's Compensation Board showing proof of ability to pay compensation directly.

OTHER INSURANCE FOR THE CONTRACTOR:

The Contractor shall obtain and maintain, at his expense, insurance with minimum limits, as shown below, and shall protect the Contractor and Owner for any claims for property damage or bodily injury, including death, which may arise out of operations under this contract. The Contractor shall furnish the Owner certificates, policies, and cancellation endorsements, as shown below:

1. Contractor's General Liability Insurance - taken out in the name of the Contractor.
 - a. Split Limits of Liability - Bodily Injury Liability: Limits of \$500,000 for each occurrence and \$500,000 for the aggregate of operations. Property Damage Liability: Limits of \$100,000 for each occurrence and \$200,000 for the aggregate of operations.
Or
If Combined Single Limit Liability:
Bodily Injury and Property Damage Combined:
\$500,000 each occurrence
\$500,000 aggregate
 - b. Cancellation Endorsement - These insurance coverages shall not be canceled until at least thirty (30) days prior written notice has been given to the Owner.

- c. Disposition - Certificate from insurance company showing insurance policy must be sent to the Owner prior to commencement of work. Submit one (1) copy of certificate to Owner for approval.
2. Contractor's Public and Automobile Liability Insurance
 - a. Split Limits of Liability - Bodily Injury Liability - limits of \$250,000 for each person and \$500,000 each occurrence. Property Damage - limits of \$100,000 for each occurrence.
Or
If Combined Single Limit of Liability
Bodily Injury and Property Damage Combined:
\$500,000 each occurrence.
 - b. Cancellation Endorsement - This Insurance coverage shall not be canceled until at least thirty (30) days prior written notice has been given to the Owner.
 - c. Disposition - Certificate from insurance company showing insurance policy must be sent to Owner prior to commencement of work. Submit one (1) copy of certificate to Owner for approval.

ACCEPTABILITY OF INSURANCE COMPANIES:

No insurance will be acceptable unless written by a company licensed by the State Insurance Commissioner to do business in the State of Georgia at the time policy is issued. The company must, in addition, be acceptable to the Owner.

End of Section 022800

SECTION 024600 - AGGREGATE PIER SOIL IMPROVEMENTPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

SUBSURFACE EXPLORATION REPORT:

The Report of Subsurface Exploration on this project is on file and is available for inspection in the Architect's office. The Subsurface Exploration Report is not bound in these documents. Contractors desiring a copy of the Subsurface Soils Report may email ~~Brian Ingram with GeoHydro (bingram@geohydro.com)~~ Michael McKenzie with Nova Engineering (mmckenzie@usanova.com) and request the report. An electronic copy of the report will be returned by email.

DESCRIPTION OF WORK:

Work shall consist of designing, furnishing and installing aggregate pier elements to the lines and grades designated on the project foundation plan and as specified herein. The aggregate pier elements shall be constructed by compacting aggregate in an excavated hole using special high-energy impact densification equipment. The aggregate pier elements shall be in a columnar-type configuration and shall be used to reinforce soils for the support of high bearing pressure spread footings.

WORK INCLUDED:

Provision of all equipment, material, labor and supervision to design and install aggregate pier elements. Design shall rely on subsurface information presented in the project geotechnical report. Layout of aggregate pier elements, removal of spoils from the pad (which result from aggregate pier construction), removal of spoils off the working pad, footing excavation and subgrade preparation following aggregate pier installation is not included.

RELATED WORK:

Section 021100 - Site Work.
Section 022000 - Earthwork.

QUALITY ASSURANCE:

Codes and Standards: Perform work in compliance with applicable requirements of governing authorities having jurisdiction.

The Aggregate Pier Installer shall demonstrate that the Aggregate Pier system has been ICBO certified.

The Owner shall retain an independent Engineering testing firm to provide Quality Assurance services.

REFERENCE STANDARDS:

Design

1. Lawton, E.C., N.S. Fox, and R.L. Handy. "Control of Settlement and Uplift of Structures Using Short Aggregate Piers." ASCE. Proceedings of In-Situ Deep Soil Improvement. ASCE National Convention, Atlanta, Georgia. October 9-13, 1994.
2. Lawton, E.C. and N.S. Fox. "*Settlement of Structures Supported on Marginal or Inadequate Soils Stiffened with Short Aggregate Piers.*" ASCE. Geotechnical Special Publication No. 40: Vertical and Horizontal Deformations of Foundations and Embankments, ASCE 2, 962-974.
3. Fox, N.S. and M. Cowell. 1998. Geopier Reference Manual. Published by Geopier Foundation Company, Inc., Scottsdale, AZ. Wissmann, K.J., E.C. Lawton, and T.M. Farrell. 1999. "Behavior of Geopier-Supported Foundation Systems During Seismic Events." Technical Bulletin No. 1. Geopier Foundation Company, Inc., Scottsdale, AZ.
4. Wissmann, K.J. 1999. "Bearing Capacity of Geopier-Supported Foundation Systems." Technical Bulletin No. 2. Geopier® Foundation Company, Inc., Scottsdale, AZ.
5. Wissmann, K.J., J.M. Caskey, and B.T. Fitzpatrick. 2001. "Geopier® Uplift Resistance." Technical Bulletin No. 3. Geopier® Foundation Company, Inc., Scottsdale, AZ.
6. Wissmann, K.J., B.T. Fitzpatrick, and E.C. Lawton. 2001. "Geopier® Lateral Resistance." Technical Bulletin No. 4. Geopier® Foundation Company, Inc., Scottsdale, AZ.
7. Fitzpatrick, B.T. and K.J. Wissmann. 2002. "Geopier® Shear Reinforcement for Global Stability and Slope Stability." Technical Bulletin No. 5. Geopier® Foundation Company, Inc., Scottsdale, AZ.

Modulus and Uplift Testing

1. ASTM D-1143 – Pile Load Test Procedures
2. ASTM D-1194 – Spread Footing Load Test
3. ASTM-D-3689 – Uplift Load Test

Materials and Inspection

1. ASTM D-1241 – Aggregate Quality
2. ASTM STP 399 – Dynamic Penetrometer Testing
3. ASTM D-422 – Gradation Soils

SUBMITTALS:

The Installer shall submit a set of detailed design calculations, construction drawings, and shop drawings, (the Design Submittal), for approval at least two (2) week(s) prior to the beginning of construction. A detailed explanation of the design parameters for settlement calculations shall be included in the Design Submittal. Additionally, the quality control test program for aggregate piers, meeting these design requirements, shall be submitted. All computer-generated calculations and drawings shall be prepared and sealed by a Professional Engineer, registered in the state of Georgia.

The Aggregate Pier Designer shall have Errors and Omissions design insurance for the work. The insurance policy shall provide a minimum coverage of \$2 million per occurrence.

Modulus and uplift test data: The Installer shall furnish the General Contractor a description of the installation equipment, installation records, complete test data, analysis of the test data and recommended design parameter values based on the modulus test results. The report shall be prepared under supervision of a registered professional engineer.

Daily Aggregate Pier Progress Reports: The Installer shall furnish a complete and accurate record of aggregate pier installation to the General Contractor. The record shall indicate the pier location, length, average lift thickness and final elevations of the base and top of piers. The record shall also indicate the type and size of the densification equipment used. The Installer shall immediately report any unusual conditions encountered during installation to the General Contractor, to the Designer and to the Testing Agency.

APPROVED INSTALLERS:

Installers of Aggregate Pier Foundation Systems shall have a minimum of 5 years of experience with the installation of aggregate piers and shall have completed at least 50 projects.

Installers shall be licensed by Geopier Foundation Company, Inc. or Vibro Pier, by Keller Group, and shall have demonstrated experience in the construction of similar size and types of projects. The aggregate pier Installer shall be approved by the Owner's Engineer and must be approved two weeks prior to bid opening. The Installer shall adhere to all methods and standards described in this Specification.

Installers currently approved for these works are:

1. Peterson Contractors, Inc. – Reinbeck, Iowa
2. Keller Group - Atlanta, Georgia

DESIGN REQUIREMENTS:Aggregate Pier Design:

Aggregate piers shall be designed in accordance with generally-accepted engineering practice and the methods described in Section 1 of these Specifications. The design shall meet the following criteria:

Minimum Allowable Bearing Pressure for Aggregate Pier Reinforced Soils	5,000 psf
Minimum Aggregate Pier Area Coverage (for square Spread Footings)	30%
Estimated Total Long-Term Settlement for Footings:	≤1-inch
Estimated Long-Term Differential Settlement of Adjacent Footings:	≤ ½-inch

The design submitted by the Installer shall consider the bearing capacity and settlement of all footings supported by aggregate piers, and shall be in accordance with acceptable engineering practice and these specifications. Total and differential settlement shall be considered. The design life of the structure shall be 50 years.

The Aggregate Pier system shall be designed to preclude plastic bulging deformations at the top-of-pier design stress and to preclude significant tip stresses as determined from the shape of the telltale test curve from telltales installed in modulus test piers. The results of the modulus test shall be used to verify the design assumptions.

Conflicts in Specifications/References: Where specifications and reference documents conflict, the Architect/Engineer shall make the final determination of the applicable document.

PART 2 - PRODUCTSMATERIALS:

Aggregate used for piers constructed above the water table shall be Type I Grade B in accordance with ASTM D-1241-68, or shall be other graded aggregate selected by the Installer and successfully used in the modulus test. It shall be compacted to a densification and strength, which provides resistance to the dynamic penetration test (ASTM STP 399) of a minimum average of 15 blows per 1.75-inch vertical movement.

For aggregate used for piers constructed below the water table, the gradation shall be the same as Type I Gradation B, except that particles passing the No. 40 sieve shall be eliminated. Alternatively, No.57 stone or other stone selected by the Aggregate Pier Installer may be used. Dynamic penetration resistance testing is inappropriate for this material.

Potable water or other suitable source shall be used to increase aggregate moisture content where required.

The General Contractor shall provide such water to the Installer.

The General Contractor will provide adequate and suitable marshaling areas on the project site for the use of the Installer for the storage of aggregate and equipment.

PART 3 - EXECUTION

EXCAVATION:

All Aggregate Pier elements shall be pre-augered using mechanical drilling or excavation equipment. Installation of piers without pre-augering shall not be allowed because this technique results in significant disturbance and remolding of the matrix soils surrounding the piers.

If cave-ins occur during excavation such that the sidewalls of the hole are deemed to be unstable, steel casing or a drilling slurry shall be used to stabilize the excavation.

If cave-ins occur on top of a lift of aggregate such that the volume of the caved soils is greater than 10 percent of the volume of the aggregate in the lift, then the aggregate shall be considered contaminated and shall be removed and replaced with uncontaminated aggregate.

Densification:

Special high-energy impact densification apparatus shall be employed to densify the Aggregate Pier elements during installation. The apparatus shall apply direct **downward** impact energy to each lift of aggregate.

A minimum tamper energy level of 1,500 foot-pounds of force (CIMA rating) shall be applied by the energy source.

The bottom of the excavation shall be densified prior to the placement of the aggregate. If wet, soft or sensitive soils are present, open-graded aggregate, such as ASTM No.57 stone or other, shall be placed at the bottom of the excavation and compacted to stabilize the element bottom and may serve as the initial lift.

Densification shall be performed using a beveled tamper. The beveled tamper foot is required to adequately increase the lateral earth pressure in the matrix soil during installation.

Downward pressure shall be applied to the tamper shaft during tamping.

Each lift of aggregate shall be tamped for a minimum of 20 seconds.

Plan Location and Elevation of Aggregate Pier Elements:

The center of each pier shall be within six inches of the plan locations indicated. The final measurement of the top of piers shall be the lowest point on the aggregate in the last compacted lift. Piers installed outside of the above tolerances and deemed not acceptable shall be rebuilt at no additional expense to the Owner, unless mislocated by the General Contractor.

Rejected Aggregate Pier Elements:

Aggregate pier elements improperly located or installed beyond the maximum allowable tolerances shall be abandoned and replaced with new piers, unless the Designer approves other remedial measures. All material and labor required to replace rejected piers shall be provided at no additional cost to the Owner, unless the cause of the rejection is due to an obstruction or mislocation.

Quality Control Representative:

The Installer shall have a full-time Quality Control (QC) representative to verify and report all QC installation procedures. The Installer shall immediately report any unusual conditions encountered during installation to the Design Engineer, the General Contractor, and to the Testing Agency. The QC procedures shall include the preparation of Aggregate Pier Progress Reports completed during each day of installation and containing the following information:

- Footing and Aggregate Pier location.
- Aggregate Pier length and drilled diameter.
- Planned and actual Aggregate Pier elevations at the top and bottom of the element.
- Average lift thickness for each Aggregate Pier.
- Soil types encountered at the bottom of the Aggregate Pier and along the length of the element.
- Depth to groundwater, if encountered.
- Documentation of any unusual conditions encountered.
- Type and size of densification equipment used.

Modulus Test:

A modulus test shall be performed to verify the parameter values selected for design. The modulus tests shall be of the type and installed in a manner specified herein.

A telltale shall be installed at the bottom of the test pier so that bottom-of-pier deflections may be determined. Acceptable performance is indicated when the bottom of the pier deflection is no more than 20% of the top of pier deflection at the design stress level.

ASTM D-1143 general test procedures shall be used as a guide to establishing load increments, load increment duration, and load decrements.

With the exception of the load increment representing approximately 115% of the design maximum top of Aggregate Pier stress, all load increments shall be held for a minimum of 15 minutes, a maximum of 1 hour, and until the rate of deflection reduces to 0.01 inch per hour, or less.

The load increment that represents approximately 115% of the design maximum stress on the Aggregate Pier shall be held for a minimum of 15 minutes, a maximum of 4 hours and until the rate of deflection reduces to 0.01 inches per hour or less.

A seating load equal to 5 percent of the total load shall be applied to the loaded steel plate prior to application of load increments and prior to measurement of deflections to compensate for surficial disturbance.

Aggregate Pier modulus testing shall be performed in accordance with the requirements outlined in the Design Submittal.

The location of the aggregate pier modulus test should be coordinated with the project Geotechnical Engineer of record.

Dynamic Cone Penetrometer Test:

The Aggregate Pier elements shall be tested by the Dynamic Cone Penetrometer method (ASTM STP 399) at locations within the upper $\frac{1}{3}$ of the pier shaft length.

The minimum acceptable criteria as an indicator of acceptable densification shall be at least 15 blows per 1- $\frac{3}{4}$ inch penetration.

Dynamic Cone Penetrometer testing shall be performed in each Aggregate Pier until such time as five consecutive tests indicate that the minimum criterion is met. Thereafter, such tests need not be performed on every pier, provided that the aggregate used in the elements is representative of that previously tested. If average penetration resistances measured exceed 15 blows, and less than 10% of tests fall below 15 blows, then testing may be reduced to spot checks. A pattern of successful tests is sufficient to reduce testing to several tests per day.

Observation of questionable aggregate moisture content or questionable aggregate gradation appearance may determine the need for additional dynamic penetration testing to verify that the proper densification is being achieved.

Use of Dynamic Cone Penetrometer is not appropriate for use on open-graded aggregate such as No. 57 stone.

Responsibilities of Independent Engineering Testing Agency:

The Testing Agency shall monitor the modulus and uplift test(s) when modulus or uplift test(s) are to be performed. The Installer shall provide and install all dial indicators and other measuring devices.

The Testing Agency shall monitor the installation of aggregate pier elements to verify that the production installation practices are similar to those used during the installation of the modulus test elements.

The Testing Agency shall perform Dynamic Cone Penetrometer tests as described herein.

The Testing Agency shall report any discrepancies to the Installer and General Contractor immediately.

Uplift Load Test:

Uplift load test procedures shall be conducted in general accordance with ASTM D-3687, as appropriate and except as modified herein. Uplift aggregate-pier testing shall be performed (if required on the Contract Documents) in accordance with the requirements outlined in the Design Submittal.

The location of the uplift load test should be coordinated with the project Geotechnical Engineer of record.

Uplift load test information shall be used to verify that the aggregate-pier system design is consistent with the behavior exhibited during the uplift load test.

Bottom Stabilization Verification Test:

After completion of the bottom pier bulb, or at anytime during the process of constructing the pier, the energy source may be turned off, and bottom stabilization verification test may be performed. These tests shall be performed when a new soil formation is encountered, or at the beginning of a project to provide quantitative information on pier stabilization.

Bottom Stabilization Tests are performed by placing a reference bar over the cavity, marking the tamper shaft, applying energy to the tamper for an additional 15 seconds, and observing the downward deflection of the tamper shaft by observing the deflection of the mark on the tamper shaft.

Acceptable performance is indicated if the vertical movement of the shaft is less than 150% of the vertical movement measured for the modulus test pier or $\frac{3}{8}$ th of an inch.

If the measured vertical movement exceeds 150% of the value achieved during the modulus test, added energy is applied to re-densify the bulb. The procedure for measure is then repeated. If there is still movement greater than 150% of that achieved during the modulus test and greater than $\frac{1}{2}$ inch, a lift of loose aggregate may be placed on top of the compacted aggregate, and the verification test may be performed on this next lift after it is densified. If there is excessive movement on this lift, another lift may be placed and tested. Movement must be limited to below 150% of the values achieved for the modulus test before completion of $\frac{2}{3}$ of the pier depth.

RESPONSIBILITIES OF GENERAL CONTRACTOR:

Preparation:

The General Contractor shall locate and protect underground and aboveground utilities and other structures from damage during installation of the Aggregate Pier elements.

The General Contractor will provide the site to the Installer, after earthwork in the area has been completed.

Site subgrade shall be established by the General Contractor within 4 inches of final design subgrade, as approved by the Design Engineer.

A working surface will be established and maintained by the General Contractor to provide wet weather protection of the subgrade and to provide access for efficient operation of the Aggregate Pier installation.

Layout of the Aggregate Pier Elements:

The General Contractor shall provide layout (construction staking) of the Aggregate Piers. The General Contractor shall provide ground elevations in sufficient detail to estimate drilling depth elevations to within 2 inches.

Aggregate Pier Excavation:

Should any obstruction be encountered during drilling or excavation for aggregate piers, the General Contractor shall be responsible for removing such obstruction, or the pier shall be relocated or abandoned. Obstructions include, but are not limited to, boulders, timbers, concrete, bricks, utility lines, etc., that prevent installing the aggregate piers to the required depth, or cause the aggregate pier to drift from the required locations. Dense natural rock or weathered rock shall not be deemed obstructions, and piers may be terminated short of design lengths on such materials. If the General Contractor cannot or does not remove such obstructions within one hour from the time the Installer reports the obstruction to the General Contractor, the Installer may remove such obstructions with his own means. Should this occur, the Installer shall receive an extra to the contract to account for their additional expenses, including delay time involved to crew and equipment.

Utility Excavations:

The General Contractor shall coordinate all excavations made subsequent to Aggregate Pier installations so that at least five feet of horizontal distance remains between the edge of any installed Aggregate Pier and the excavation. Protection of completed Aggregate Pier elements is the responsibility of the General Contractor. In the event that utility excavations are required at horizontal distances of less than five feet from installed Aggregate Piers, the General Contractor shall contact the Aggregate Pier Designer to develop construction solutions to minimize impacts on the installed Aggregate Piers.

Recommended procedures may include:

Using cement-treated base to construct portions of the Aggregate Piers subject to future excavations.

Replacing excavated soil with compacted crushed stone in the portions of excavations the where Aggregate Piers have been disturbed. The placement and compaction of the crushed stone shall meet the following requirements.

The crushed stone shall meet the gradation specified by the Designer.

The crushed stone shall be placed in a controlled manner using motorized impact compaction equipment.

The aggregate should be compacted to 95% of the maximum dry density as determined by the modified Proctor method (ASTM D-1557).

The Testing Agency shall be on site to observe placement, compaction, and provide density testing. The test results shall be submitted to the Designer and the General Contractor. The General Contractor shall provide notification to the Testing Agency and the Designer when excavation, placement, and compaction will occur and arrange for construction observation and testing.

Footing Bottoms:

Excavation and surface compaction of all footings shall be the responsibility of the General Contractor.

Foundation excavations to expose the tops of Aggregate Pier elements shall be made in a workmanlike manner, and shall be protected until concrete placement, with procedures and equipment best suited to (1) prevent softening of the matrix soil between and around the Aggregate Pier elements before pouring structural concrete, and (2) achieving direct and firm contact between the dense, undisturbed Aggregate Pier elements and the concrete footing.

Recommended procedures for achieving these goals are to:

Limit over-excavation below the bottom of the footing to 3-inches (including disturbance from the teeth of the excavation equipment,

Compaction of surface soil and top of Aggregate Pier elements shall be prepared using a motorized impact compactor ("Wacker Packer", "Jumping Jack", or similar). Sled-type tamping devices shall not be used. Compaction shall be performed over the entire footing bottom to compact any loose surface soil and loose surface pier aggregate.

Place footing concrete immediately after footing excavation is made and approved, preferably the same day as the excavation. Footing concrete must be placed on the same day if the footing is bearing on expansive or sensitive soils.

If same day placement of footing concrete is not possible, place a minimum 3-inch thick lean concrete seal ('mud mat') immediately after the footing is excavated and approved.

The following criteria shall apply, and a written inspection report sealed by the project Geotechnical Engineer shall be furnished to the Installer to confirm:

That water (which may soften the unconfined matrix soil between and around the Aggregate Pier elements, and may have detrimental effects on the supporting capability of the Aggregate Pier reinforced subgrade) has not been allowed to pond in the footing excavation at any time.

That all Aggregate Pier elements designed for each footing have been exposed in the footing excavation.

That immediately before footing construction, the tops of all the Aggregate Pier elements exposed in each footing excavation have been inspected and recompactd as necessary with mechanical compaction equipment, and that the tops of any Aggregate Pier elements which may have been disturbed by footing excavation and related activity have been recompactd to a dry density equivalent to at least 95% of the maximum dry density obtainable by the modified Proctor method (ASTM D-1557).

That no excavations or drilled shafts have been made after installation of Aggregate Pier elements within horizontal distance of five feet from the edge of any pier, without the written approval of the Installer or Designer.

End of Section 024600

SECTION 024800 - GRASSINGPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of grassing is as shown on drawings and specified herein, and includes: furnishing all materials, equipment and labor necessary for preparation of final grades in lawn areas, finished grading, soil treatment, and protection, maintenance, guarantee and replacement of lawns.

Subgrade Elevations: Excavation, filling and grading required to establish elevations shown on drawings are not specified in this section. Refer to earthwork sections.

QUALITY ASSURANCE:

Subcontract grassing work to a single firm specializing in grassing work.

Landscape subcontractor shall provide continuous superintendence by an experienced plantsman during, preparation and execution of all grassing.

Source Quality Control:

General: Ship grassing materials with certificates of inspection required by governing authorities. Comply with regulations applicable to grassing materials.

Do not make substitutions. If specified material is not obtainable, submit proof of non-availability to Architect, together with proposal for use of equivalent material. All changes in grass seed type, quality or procedure in applying, shall be approved in writing prior to start of work.

Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

SUBMITTALS:

Certification: Submit certificates of inspection as required by governmental authorities. Submit manufacturer's or vendors certified analysis for soil amendments and fertilizer materials. Submit other data substantiating that materials comply with specified requirements.

Submit seed vendor's certified statement for each grass seed mixture required, stating botanical and common name, percentage by weight, and percentages of purity, germination, and weed seed for each grass seed species.

Soil Samples: The Contractor shall take soil samples from several areas of the site to be grassed and have them analyzed by the Agricultural Extension Service. The results of the analysis shall determine the best fertilizer mixture to use on the site.

A copy of the soil analysis shall be submitted to the Owner and Architect for review.

Submit sample of bonded fiber matrix (BFM).

DELIVERY, STORAGE AND HANDLING:

Packaged Materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at site.

JOB CONDITIONS:

Proceed with and complete grassing work as rapidly as portions of site become available, working within seasonal limitations for each kind of grassing work required.

Utilities: Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.

Water will be furnished by the Owner without cost to the Contractor for projects at existing school campuses.

Contractor shall furnish all watering equipment required.

PART 2 - PRODUCTS

TOPSOIL:

Topsoil: Provide topsoil for areas to be grassed or sodded from onsite topsoil storage resulting from initial grading operations.

Plant mix for all planter and landscape areas shall be a sandy clay loam with texture as follows: 20-40% sand; 45-75% clay; and 0-30% silt. It shall contain from 2-½ to 5% organic matter. Topsoil shall be uniform quality, free from hard clods, sod, stiff clay, hard pan, stones larger than 1", lime cement, ashes, slag, concrete, tar residues, tarred paper, boards, chips, sticks, or other undesirable materials. There must be a slight acid reaction to the soil with no excess of calcium or carbonate. Soil shall be delivered in a loose friable condition. Prior to delivery, soil test shall be taken and submitted for approval, along with packaged or boxed and labeled soil samples.

SOIL AMENDMENTS:

Peat Humus: FS Q-P-166 decomposed peat with no identifiable fibers and with ph range suitable for intended use.

Sand: Clean, washed sand, free of toxic materials.

Mulch: Organic mulch free from deleterious materials and suitable for top dressing of trees, shrubs or plants and consisting of long needle Pine Straw Mulch.

Commercial Fertilizer: For lawns, the fertilizer shall be a complete, slow-release type. The nitrogen content shall be derived from either organic or inorganic sources and meeting the following minimum requirements of plant food by weight, unless the soil analysis and report indicates a need for a different fertilizer mixture in which case the recommended mixture shall be furnished and applied. Compliance with all State and Federal laws relative to fertilizer is required.

19% Nitrogen - 19% Phosphoric Acid - 19% Potash

Ammonium Nitrate: Ammonium nitrate shall be a commercial product in dry granular form of recent manufacture and shall be delivered in the original, unopened containers each bearing the manufacturer's guaranteed statement of analysis, it shall contain not less than 33.5 % Nitrogen.

Ground Limestone: Lime shall be ground dolomitic limestone containing not less than 85 % of total carbonates and shall be ground to such a fineness that 50 % will pass through a 100-mesh sieve and 90 % will pass through a 20-mesh sieve. Coarser material will be acceptable, provided the specified rates of application are increased proportionately on the basis of quantities passing the 100-mesh sieve.

Pre-emergent Weed Control: Shall be Scotts Pro Grow ornamental herbicide 2 (granular), or approved equal.

GRASS MATERIALS:

Permanent grass shall be "Common Bermuda" and shall be installed by GCPS unless otherwise noted.

Temporary grasses shall be fescue or Rye.

Grass Seed: Provide fresh, clean, new-crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. Provide seed mixture composed of grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified.

<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>	<u>MINIMUM PURITY</u>	<u>MIN. GERMINATION</u>
Cynodon	Common	98%	85%
Hybrid Common	Bermuda (Hulled)		

Four (4) pounds Hulled Bermuda per 1,000 sq.ft.

Fescuta Elatior: var. arundinacea	Kentucky 31 Fescue	98%	85%
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Eight (8) pounds Kentucky 31 Fescue per 1,000 sq.ft.

Lolium multi- florum	Winter Rye	98%	85%
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Ten (10) pounds per 1,000 sq. ft.

MISCELLANEOUS LANDSCAPE MATERIALS: See PART 3 - EXECUTION and Drawings for specific use locations for the following materials:

Erosion Control Fabric: Shall be S75 as manufactured by North American Green, or approved equal. Erosion control blanket shall be a machine produced mat of 100% agricultural straw. The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with a polypropylene netting having an approximate ½" x ½" mesh and be sewn together with cotton thread. Install blanket as recommended by manufacturer. Immediately after installing blanket water as necessary to insure ground contact and seed germination.

Anti-Erosion Mulch: Provide clean, seed-free salt hay or threshed straw of wheat, rye, oats or barley.

Bonded Fiber Matrix: Shall be comprised of a long strand, thermally produced wood fibers passing a freeness test at 760cc (MLS) level or below (>88% of total volume by weight) held together by organic tackifiers (10%) and mineral bonding agents (>2%) which upon drying, become insoluble and non-dispersible. The matrix which forms shall be designed, tested and proven to perform in a manner equal or superior to biodegradable erosion control blankets (ECB's). Documentation of testing at an independent university laboratory shall be provided which demonstrates superior performance as measured by reduced water runoff, reduced soil loss, and faster plant germination, as compared to erosion control blankets. The formed matrix shall meet the following requirements.

The material, when mixed into a liquid slurry, shall pass a free liquid quality control test (liquids separate from fibrous solids no greater than one inch in one minute's time as measured on a standard test board).

The binder shall not dissolve or disperse upon rewetting.

The matrix shall have no holes > 1mm in size.

The matrix shall have no gaps between product and the soil.

The matrix shall have minimum water holding capacity of 1000g/100g (1.2 gal/lb matrix).

The matrix shall have no germination or growth inhibiting factors and shall not form a water insensitive crust.

The matrix shall be comprised of materials which are 100% biodegradable and 100% beneficial to plant growth.

PART 3 - EXECUTION

TIME OF PLANTING:

At the option and on the full responsibility of the Contractor, planting operations may be conducted under unseasonable conditions without additional compensation.

SEASON:

Planting of Bermuda seed shall be between March 1 and August 1. Planting of Fescue or Rye shall be as approved by Architect.

PREPARATION:

New Planting:

Amended Soil: Soil used in planting shall be topsoil or suitable existing soil either of which shall be thoroughly mixed with one part of peat, one part manure, five parts of existing soil. Very poor soil, hardpan, or other soil injurious to plants shall not be used. Soil used in planting shall be thoroughly mixed with 5 pounds of 5-10-5 formula Commercial Fertilizer per cubic yard.

Preparation for Planting Lawns (sodded or seeded):

Prepare the soil by thoroughly cultivating, discing, hand raking, etc., to a minimum depth of 6" to produce a smooth, even grade free of all construction debris and stone ¾" and larger in diameter. Finish grade shall be approved by Owner and landscape Architect prior to any further work. Remove all debris from site.

Spread top soil to minimum depth required to meet lines, grades and elevations shown, after light rolling and natural settlement. Add specified soil amendments and mix thoroughly into upper 6" of topsoil.

Approximately two (2) days prior to the start of seeding or laying sod, apply ground limestone at the rate of 120 pounds per 1000 sq.ft. of lawn area. Mix thoroughly into upper 6" of topsoil. (Verify/compare rate with soil test and adjust application of limestone accordingly).

In conjunction with the above operation, or immediately afterwards, apply the specified commercial fertilizer over all lawn areas at the rate of 10 pounds per 1,000 sq.ft. of lawn area. Mix thoroughly into upper 6" of topsoil. (Verify/compare rate with soil test and adjust application of fertilizer accordingly.)

Preparation of Unchanged Grades: Where lawns are to be planted in areas that have not been altered or disturbed by excavating, grading, or stripping operations, prepare soil for lawn planting as follows: Till to a depth of not less than 6"; apply soil amendments and initial fertilizers as specified; remove high areas and fill in depressions; till soil to a homogenous mixture of fine texture, free of lumps, clods, stones, roots and other extraneous matter.

Apply lime at the rate of 50 lbs. to 1,000 sq.ft., apply fertilizer at rate of 1 lb. of actual nitrogen with not less than 4% phosphoric acid and 2% potassium and mix thoroughly into upper 6" of topsoil.

At the end of the Maintenance Period and prior to the final inspection, apply five (5) pounds of the specified commercial fertilizer per 1,000 sq.ft. of lawn area and immediately water.

Fine grade lawn areas to smooth, even surface with loose, uniformly fine texture. Roll, rake and drag lawn areas, remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.

Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.

Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

Preparation for Sod Lawns:

Prepare the area to be sodded by thoroughly cultivating, discing, hand raking, etc., as necessary to produce a smooth even grade.

SEEDING NEW LAWNS:

Do not use wet seed or seed which is moldy or otherwise damaged in transit or storage.

Sow seed using a spreader or seeding machine. Do not seed when wind velocity exceeds 5 mi. per hr. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other.

Sow Bermuda seed at the rate of two tenths (.2) lbs. of seed to one thousand (1000) sq. ft.

Sow Kentucky 31 Fescue Seed at the rate of one and one tenth (1.1) lbs. of seed to 1,000 sq. ft.

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

Protect seeded areas against erosion by spreading specified lawn mulch after completion of seeding operations. Spread uniformly to form a continuous blanket not less than 1-1/2" loose measurement over seeded areas. Mulch blown by wind or washed away by rain shall be replenished along with reseeding promptly after event(s).

Water newly planted areas and keep moist until new grass is established.

Bonded Fiber Matrix (BFM) shall be installed by a Contractor certified by the manufacturer to be trained in the proper procedures for mixing and application of the product. The BFM shall be mixed according to manufacturer's recommendations and contractor shall demonstrate "free liquid" test to inspector upon request. Bonded Fiber Matrix shall be spray-applied at a rate of 3,000 - 4,000 lb/acre, utilizing standard hydraulically seeding equipment in successive layers as to achieve 100% coverage of all exposed soil. The BFM shall not be applied immediately before, during or after rainfall, such that the matrix will have opportunity to dry for up to 24 hours after installation. BFM shall be utilized for both temporary vegetation and permanent vegetation.

CLEANUP AND PROTECTION:

During grassing work, keep pavements clean and work area in an orderly condition.

Protect grassing work and materials from damage due to grassing operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

Any soil, mulch or similar material which has been brought onto paved areas by hauling operations, or otherwise, shall be removed promptly, keeping these areas clean at all times. Upon completion of the grassing, all excess soil, stones and debris which has not previously been cleaned up shall be removed from the site. All lawns and planting areas shall be prepared for final inspection.

TEMPORARY LAWNS:

All areas in which earthwork shall be suspended for more than two (2) weeks shall be grassed with temporary grass.

Annual rye grass (*Lilium Multiflorum*) shall be sown at the rate of 430 pounds of seed per acre.

Temporary lawns shall be maintained by the Contractor until the permanent lawn season, at which time the rye grass shall be mowed down to the ground surface, the lawn area disc harrowed, the soil prepared for planting lawns.

MAINTENANCE:

Lawn maintenance shall begin immediately after lawns are planted and shall continue in accordance with the following requirements:

Lawns or grassed areas shall be protected and maintained by watering, mowing, reseeding, and resodding as necessary for as long as is necessary to establish a uniform stand of the specified grasses and until accepted by the Architect. Scattered bare spots, none of which is larger than one square foot, will be allowed up to a maximum of 3% of any lawn area or grassed area. It shall be the responsibility of the Contractor to repair any erosional damage to the lawn area.

All lawn areas that do not show satisfactory growth within 18 days after sowing shall be re-sown and re-fertilized as directed until a satisfactory lawn is established. The lawns shall be considered established when they are reasonably free from weed, green in appearance and the specified grass is vigorous and growing well on each square foot of lawn area.

Full coverage is required in 60 days.

In addition to supplemental fertilizer and watering as necessary, Contractor shall mow developing grassed or sodded areas as grasses begin to grow to promote growth. Mowing shall continue through Substantial Completion, at 7 to 14 day intervals..

Approximately four (4) weeks after laying the sod, or sowing seed if grass has started to cover well, apply three (3) pounds of ammonium nitrate per 1,000 sq.ft. to all lawn areas and immediately water using a fine spray. (Follow-up application shall be scheduled with Owner's approval.)

Watering: Soak soil to a minimum depth of 4" immediately after sodding. Do not wash away soil or sod. Keep all surfaces continuously moist thereafter until 30 calendar days after the lawn has been sodded. Use fine spray nozzles only.

Sidewalks, streets, and other paved areas shall be kept clean when planting and maintenance operations are in progress.

INSPECTION, ACCEPTANCE, GUARANTEE AND REPLACEMENT:

The Contractor may request inspection for acceptance 60 days after all seeding work.

The Architect shall inspect all work for acceptance upon written request of the Contractor. The request shall be received at least ten (10) days before the anticipated date of inspection.

Upon completion of all repairs or replacements which may appear at that time to be necessary in the judgement of the Architect, the Architect shall certify in writing to the Owner as to the acceptance of the work.

Clearing of ground: Upon completion of the work, the grounds shall be cleared of all debris, of all superfluous materials and all equipment which shall be entirely removed from the premises to the satisfaction of the Owner.

End of Section 024800

SECTION 025130 - ASPHALT PAVINGPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of asphalt concrete paving work is shown on drawings.

NOTE: Owner's existing curbs, walks and paving will be reviewed prior to construction, subsequent damage shall be corrected in this contract.

JOB CONDITIONS:

Weather Limitations: Apply tack coats when ambient temperature is above 50 deg. F. (10 deg. C), and when temperature has not been below 35 deg. F. (1 deg. C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.

Construct asphalt concrete surface course when atmospheric temperature is above 40 deg. F. (4 deg. C), and when base is dry. Do not install asphaltic concrete base course on frozen base. Base course may be placed when air temperature is above 30 deg. F. (-1 deg. C) and rising.

Grade Control: Establish and maintain required lines and elevations.

Reference Specifications: All materials and methods of construction of base and pavement shall conform to the requirements of Standard Specifications for Road and Bridge Construction, Department of Transportation, State of Georgia, 2016 Edition.

PART 2 - PRODUCTSMATERIALS:

General: Use locally available materials and gradations which exhibit a satisfactory record of previous installations.

HEAVY DUTY PAVING: Bus Lanes and Heavy Duty Service Traffic.

Minimum thickness, measured after compaction:

Graded Aggregate Base	8"
Asphalt 19mm (Superpave) Binder	2"
Asphalt 9.5 mm (Superpave) Topping	2"

ASPHALT SAWCUT & PATCH: (Where Shown on Drawings).

Minimum thickness, measured after compaction:

3000 PSI Concrete Base	6" thick after compaction
Asphalt 9.5mm (Superpave) Binder	1 ½" thick (9.5mm Superpave)
Asphalt 9.5 mm (Superpave) Topping	1" thick (9.5mm Superpave) Type I.

COMPACTION:

All areas to receive paving shall be proof-rolled under observation of the Architect or Testing Lab.

Subgrade - 95% Density

Crusher Run Stone Base - 95% Density

Graded Aggregate Base (GAB): Aggregate shall be crushed stone consisting of hard durable rock fragments free from clay and reasonably free from flat, elongated or soft pieces of organic matter. It shall be graded 2" and down.

Tack Coat: Provide in accordance with DOT Specs. Section 428. Minimum acceptable between course 0.4 gal per s.y.

Bituminous Concrete: Surface course shall consist of hot plant mix material.

Grading Requirement Percent Passing (with mixture control tolerances):

Sieve Sizes	Binder Course (19 mm Superpave)	Surface Course (9.5 mm Superpave)
1"	100	
3/4"	90-100 (± 8.0)	100
1/2"	60-89 (± 8.0)	98-100 (± 2.0)
3/8"	55-75 (± 5.6)	90-100 (± 5.6)
No. 4		65-85 (± 5.6)
No. 8	32-36 (± 4.6)	48-55 (± 4.6)
No. 200	4.0-6.0 (± 2.0)	5.0-7.0 (± 2.0)

Herbicide Treatment: Commercial chemical for weed control, registered by Environmental Protection Agency. Provide granular, liquid or wettable powder form.

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

Allied Chemical Corp.
 Achem Products, Inc.
 Ciba-Geigy Corp.
 Dow Chemical U.S.A.
 E.I. DuPont De Nemours & Co., Inc.
 FMC Corp.
 Thompson-Hayward Chemical Co.
 U.S. Borax and Chemical Corp.

Traffic Marking Paint: Prismo, Devove, Glidden, Sherwin Williams, Heavy Duty Thermoplastic Traffic Paint.

PART 3 - EXECUTION

At no time shall any recycled asphaltic concrete be used on any project for the Gwinnett County Board Education for either binder or top course. **Do Not** use recycled materials.

Remove loose material from compacted subbase surface immediately before applying herbicide treatment.

Subgrade: Prepare by scarifying if necessary and proofroll with a fully loaded tandem dump truck or a ten ton power roller. All defective areas which pump or shove, or are found soft shall be removed and satisfactorily repaired and test rolled again as specified in Section 221 DOT Specs. This preparation is in addition to work required under Sections Site Clearing or Earthwork.

Notify Contractor of unsatisfactory conditions. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving.

Herbicide Treatment: Apply chemical weed control agent in strict compliance with manufacturer's recommended dosages and application instructions. Apply to compacted, dry subbase prior to application of prime coat.

Topping: 9.5 mm(hot mix) shall be applied by means of a mechanical spreader to a thickness of not less than one (1.5") inch after compaction and at no point shall vary more than one-quarter (¼) inch from a true section. Any high, low or defective areas shall be immediately remedied by cutting out the course at such area and replacing with fresh hot mix, to be immediately compacted to conform to the surrounding area and thoroughly bonded thereto.

Structure Top Adjustments:

Adjust existing storm, sanitary and utility structure tops (including cleanouts) to receive new asphalt resurfacing course. Tops shall be flush with new asphalt resurfacing course. Contractor shall not cover/blind structure tops with new asphalt wearing course. Contractor shall conform with GA DOT standards and specifications for raising structure tops.

Damaged Paving: Any paving which has been discolored by oil spills or marked during construction shall have the damaged topping or binder removed and replaced. A topping patch will not be accepted. In replacing topping, the grade shall not be changed.

ANY DAMAGED PAVING REPLACED SHALL BE SAW CUT TO STRAIGHT LINES. NO SPREADING WILL BE ALLOWED.

PLACING MIX:

General: Place asphalt concrete mixture on prepared surface, spread and strike-off. Spread mixture at minimum temperature of 225 deg. F. (107 deg. C). Place inaccessible and small areas by hand. Place each course to required grade, cross-section, and compacted thickness.

Paver Placing: Place in strips not less than 10' wide, unless otherwise acceptable to Architect. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete base course for a section before placing surface course.

Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

ROLLING:

General: Begin rolling when mixture will bear roller weight without excessive displacement.

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

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

Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.

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

Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

TRAFFIC AND LANE MARKINGS:

Cleaning: Sweep and clean surface to eliminate loose material and dust.

Do not apply traffic and lane marking paint until layout and placement has been verified with Architect.

Signage:

All Fire Lane signage shall be in the contract. See Civil Drawings. Do not paint Fire Lane curbs.

Striping:

Colors:

White: All auto parking spaces (4" wide), bus lanes (5' wide), pedestrian crossings, direction arrows, stopbars, general no-parking zones (including along curbs), speed breakers and other cautionary areas.

Yellow: Traffic lane direction dividers (two-way traffic) only (5" wide).

At concrete curbs adjacent to fire hydrants, the curbing shall be painted solid "yellow" for a distance of five (5) feet each side of the hydrant, for a total of ten (10) feet of painted curb at each hydrant.

Light Blue: For highlight/background to WHITE in Handicap Symbol. Striping surrounding Handicap Symbol shall be blue.

Allow seven to fourteen days after placement of asphalt topping before installing striping.

Apply paint with mechanical equipment to produce uniform straight edges 4" wide, unless otherwise noted. All letters, symbols, and numbers to be 8" high. Apply in 2 coats at manufacturer's recommended rates not less than 15 mils thick (dry). Paint to be applied with temperature above 50 degrees F.

End of Section 025130

SECTION 025200 - CONCRETE WALKS, CURBS, AND PAVINGPART 1 - GENERALRELATED DOCUMENT:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work specified in this section.

DESCRIPTION OF WORK:

Extent of curbs, gutters, steps, and walks is shown on drawings.

Prepared subbase is specified in "Earthwork" section.

Concrete and related materials are specified in Division 3.

Joint fillers and sealers are specified in Division 7.

QUALITY ASSURANCE:

Codes and Standards: Comply with local governing regulations if more stringent than herein specified.

JOB CONDITIONS:

Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTSMATERIALS:

Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

Use flexible spring steel forms or laminated boards to form radius bends as required.

Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.

Provide support for welded wire fabric to maintain design elevation of reinforcing.

Synthetic Fiber Concrete Reinforcement: Fibermesh 150, 100% virgin homopolymer polypropylene multi-filament fibers, containing no reprocessed olefin materials.

Fiber mesh reinforcement shall be used in lieu of welded wire fabric for all exterior site concrete.

Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 40.

Concrete Materials: Comply with requirements of applicable Division 3 sections for concrete materials, admixtures, bonding materials, curing materials, and others as required.

Expansion Joint Materials: Comply with requirements of applicable Division 7 sections for preformed expansion joint sealers. Provide fiber type asphalt impregnated joint material.

Curing and Sealing Compound: Conform to TT-C-800, with 30% solids content minimum.

CONCRETE MIX, DESIGN AND TESTING:

Comply with requirements of applicable Division 3 sections for concrete mix design, sampling and testing, and quality control, and as herein specified.

Design mix to produce normal-weight concrete consisting of portland cement, aggregate, air-entraining admixture and water to produce the following properties:

Compressive Strength: 3000 psi, minimum at 28 days, unless otherwise noted.

Slump Range: 8" for concrete containing HRWR admixture (super-plasticizer); 3" for other concrete.

Non-slip Aggregate: "Alumogrit" aluminum filings.

Air Content: 5% to 8%.

Fiber Mesh: 1.5 lbs. per cubic yard of concrete.

PART 3 - EXECUTION

SURFACE PREPARATION:

Remove loose material from compacted subbase surface immediately before placing concrete.

Proof-roll prepared subbase surface to check for unstable areas and need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

FORM CONSTRUCTION:

Set forms to required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

Check completed formwork for grade and alignment to following tolerances:

Top of forms not more than 1/8" in 10'.

Vertical face on longitudinal axis, not more than 1/4" in 10'.

Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

CONCRETE PLACEMENT:

General: Comply with requirements of Division 3 sections for mixing and placing concrete, and as herein specified. All exterior slab-on-grade concrete walks, pads and paving shall contain polymer type fiber-mesh reinforcement in lieu of wire mesh.

Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

Place concrete using methods which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.

Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2-hour, place a construction joint.

Steps: Install 1/8" wash at each tread all concrete steps.

Curbs and Gutters: Shall be "L" type. Automatic machine may be used for curb and gutter placement at Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results which meet or exceed minimums specified. Machine placement must produce curbs and gutters to required cross-section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.

JOINTS:

General: Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.

When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.

Weakened-Plane (Contraction) Joints (Wk-PIJt): Provide weakened-plane (contraction) joints, sectioning concrete into areas as shown on drawings. Construct weakened-plane joints for a depth equal to at least $\frac{1}{4}$ concrete thickness.

Tooled weakened-plane, construction, and pattern joints not allowed.

Construction Joints (CnsJt): Place construction joints at end of placements and at locations where placement operations are stopped for a period of more than $\frac{1}{2}$ -hour, except where such placements terminate at expansion joints.

Expansion Joints at concrete curbs and gutters:

Place at ends of all returns.

Dummy expansion joints every 10' and $\frac{1}{2}$ " fiber expansion joints not more than 40' (forty) foot intervals.

Expansion Joints (ExpJt): Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.

Extend joint fillers full-width and depth of joint, and not less than $\frac{1}{2}$ " or more than 1" below finished surface where joint sealer is indicated.

Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together.

Walks and Plazas: Place expansion joints at not more than forty (40) feet on centers and at intersections with curbs, steps and other walks.

Fillers and Sealants: Comply with the requirements of applicable Division 7 sections for preparation of joints, materials, installation, and performance.

CONCRETE FINISHING:

After striking-off and consolidating concrete, smooth surface by screening and wood floating. Adjust floating to compact surface and produce uniform texture.

After floating, test surface for trueness with a 10' straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to ½" radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

After completion of floating when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:

Exterior Walks, Landings, Concrete Paving:

Fine Broom finish, using a stiff bristle push broom by drawing across concrete surface, perpendicular to adjacent grid panel. Repeat operation if required to provide a fine broom texture acceptable to Architect.

Stair Treads, Ramps:

On inclined slab surfaces, including steps, provide a wood float finish with no-slip aggregate. Apply at 25# per 100 sq. Ft. and work evenly into surfaces.

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

At concrete curbs adjacent to fire hydrants, the curbing shall be painted solid "yellow" for a distance of five (5) feet each side of hydrant, for a total of ten (10) feet of painted curb at each hydrant.

CURING:

Protect and cure finished concrete paving, complying with applicable requirements of Division 3 sections. Use curing and sealing compound or approved moist-curing methods.

REPAIRS AND PROTECTIONS:

Repair or replace broken or defective concrete, as directed by Architect.

Protect concrete from damage until acceptance of work. Sweep concrete and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

End of Section 025200

SECTION 025400 - EROSION, SEDIMENTATION AND POLLUTION CONTROLSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

The manual for Erosion and Sediment Control in Georgia, 2016 Edition, as published by the Georgia Soil and Water Conservation Commission, "Best Management Practices". Apply to all land disturbing activities.

The State of Georgia Department of Natural Resources Environmental Protection Division "National Pollution Discharge Elimination System" General Permit No. GAR 100001. This permit applies to all land disturbing activities for this project.

RELATED SECTIONS:

Section 022000, Earthwork

Section 024800, Grassing

SCOPE OF WORK:

The work specified in this Section consists of furnishing, installing and maintaining temporary erosion controls and temporary sedimentation controls, and pollution controls (air, water, soil) as specified herein and as shown on drawings. The work shall include all labor, equipment and materials, and performing all operations in connection with site preparation through final site stabilization.

Erosion and sediment control "Best Management Practices" shall be installed prior to land disturbing activities, during land disturbing activities and properly maintained until a permanent vegetative cover is provided on all disturbed areas. Contractor shall strictly adhere to Land Disturbance Construction Activities Sequence.

Erosion control measures shall be maintained at all times. Added erosion and sedimentation control measures shall be installed if deemed necessary by on site inspections by the local governing authority.

Temporary erosion controls shall include grassing, mulching, watering and reseeding on-site sloped surfaces, providing berms and/or ditches at the top of the slopes and providing interceptor ditches at the ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or minimized. Contractor shall anticipate multiple temporary polyacrylamide (PAM), grassing and mulching applications to the construction site during the construction period.

Temporary sedimentation controls shall include silt dams, traps, barriers and appurtenances (refer to erosion & sediment control plan) facilities, etc.

SUBMITTALS:

Schedule of operations: Submit schedule of proposed operations conforming with the "Land Disturbance Activities Sequence" as delineated on the erosion, sediment and pollution control plan, including program for erosion control measures, logs, documentation, identified superintendent with required continuing education certification, maintenance of control facilities and vegetative practices. Show anticipated starting and completion dates for land-disturbing activities including excavation, filling and rough grading, finished grading, construction of temporary and permanent control measures, and disposition of temporary sediment control measures.

Submit a sample of erosion control blanket material such as "Curlex", "Bon Terra-CS2" or "Ero-Mat" by Verdyol for all slope areas 3:1 and greater.

Submit a sample of erosion control blanket such as Bon Terra CS1, North American Green S75 or equal for all slope areas which are three horizontal to one vertical (3:1) slopes and less.

Submit samples of anionic polyacrylamide (PAM) and PAM gel bars or logs.

Submit sample of bonded fiber matrix (BFM).

PROJECT CONDITIONS:

Furnish and install erosion control measures prior to or concurrent with any land disturbance activity. Contractor shall conform with the Land Disturbance Activities Sequence. Contractor shall protect the existing downstream from siltation and pollution trespass. Sediment shall be the Contractor's responsibility and said sediment shall be removed by the Contractor at no additional cost to the Owner.

Schedule grading operations to allow permanent erosion control to take place in the same construction season. Avoid or minimize exposure of soils to winter weather. Maintain all controls until vegetative cover has been established.

Construct and maintain temporary erosion control construction until such time as permanent paving, planting and restoration of natural areas is effective in control of erosion from the site. Extent of erosion control construction shall be responsibility of Contractor.

Protect adjacent and downstream properties from any siltation or sedimentation from disturbed areas.

For disturbed areas left idle for fourteen (14) calendar days, Contractor shall apply temporary grassing and mulch.

The Contractor is responsible for all quantities of soil erosion control measures regardless if shown on the drawings. The extent of soil erosion control measures shown on the drawings should be considered minimum.

QUALITY CRITERIA AND DOCUMENTATION:

Procedures shall comply with "Manual for Erosion and Sediment Control in Georgia", 2016 Edition published by the Georgia Soil and Water Conservation Committee. In order to conform with the State of Georgia, Federal Clean Water Act, General Contractor shall be required to file a "Notice of Intent" with the State's Environmental Protection Division (EPD) 14 calendar days prior to land disturbance activities with both the Owner's signature and the General Contractor's signature. General Contractor will also be required to keep a log book on site documenting the General Contractor's inspection of erosion control devices (minimum once/week and within 24 hrs of any storm event) and noting any corrections or modifications. The General Contractor shall document all rainfall events at the construction trailer within said log book. This will be subject to review by the Georgia EPD. General Contractor shall also file a "Notice of Termination" when the site is fully stabilized and all stormwater discharge associated with the construction activity has ceased. The Contractor shall coordinate and assist the geotechnical testing firm with the required stormwater monitoring requirement and maintain a log book on site at all times with monitoring reports prepared by the geotechnical testing firm.

PROTECTION OF ADJACENT PROPERTY AND STATE WATER BUFFERS:

Protection from sediment trespass into existing State Water Buffers and adjacent property is of the essence. Contractor shall flag and fence buffers, tree save areas and property lines prior to any construction activities. Stream Buffers (State Water Buffers) shall be appropriately flagged and protected as shown on the approved "Erosion, Sedimentation, and Pollution Control Plan". Said buffers shall be identified with signage during the construction period. Said Signage shall read as follows:

"STATE WATER BUFFER – DO NOT DISTURB"

Signs shall be placed at forty (40) foot intervals, parallel with any State Water Buffer identified on the plan(s). Signs shall be weatherproof and shall be a minimum size of 11" X 17".

Contractor shall not clear or grade within stream buffers (25' from top of bank).

Adequately protect adjacent property including sidewalks, curbing, roadways and all utilities therein. It shall be the Contractor's responsibility to restore to their original condition any damage to existing facilities resulting from the Contractor's activities.

When grading or clearing adjacent to property lines, mark all property lines between the project and adjacent property owners to insure no damage is done to adjacent property.

PROTECTION OF EXISTING FACILITIES:

The Contractor shall be responsible for protection of all existing facilities which are to remain. Items included herein are existing pavements, water lines, sewer lines, fences, drainage structures, survey monuments, power lines, telephone lines, etc. Contractor shall restore any damaged facilities, due to construction activities, to their original condition at no additional cost to the Owner.

PROTECTION OF EXISTING TREES AND VEGETATION:

Under no circumstances shall any vegetation be cut or otherwise damaged which has been shown on the drawings to be saved, or marked by the Architect or Owner to be saved.

All trees and vegetation marked to be saved shall be protected by temporary barricades, be watered and maintained where necessary and replaced when damaged during construction. Root systems cut or damaged during construction shall be protected from additional damage and covered with soil as soon as possible.

EROSION, SEDIMENT AND POLLUTION CONTROL SUPERINTENDENT:

Contractor shall provide a designated representative to remain on site during land disturbance activities with a minimum of five (5) years experience in erosion, sediment and pollution control, along with erosion & sediment control continuing education credentials and Certification as required by the Georgia Soil and Water Conservation Commission. All subcontractors on site shall also be certified as required by Georgia Law. Said representative shall oversee land disturbance operations with an emphasis on "being prepared" for rain events, through strict adherence to the land disturbance construction activities sequence, strict adherence to all "Best Management Practices" as defined in the "Manual for Erosion and Sediment Control in Georgia" and through proper earth shaping, terracing, berming, maximizing storm water travel lengths, minimizing storm water path slopes, immediate mulching, fertilizing, grassing and site stabilization through every means possible.

RECYCLING AND REFUSE COLLECTION CENTERS (WASTE MATERIALS):

The contractor shall provide appropriate refuse collection centers, which allow for glass, paper, and plastic separation. Said refuse collection centers shall be maintained on a weekly basis and transferred to an Owner-approved recycling and refuse center. The contractor shall also provide appropriate refuse containers for construction debris. Construction debris shall be recycled as possible and practical, especially in demolition and renovation situations (i.e., copper pipe, steel, concrete, glass, etc.). Illegal disposal of said materials (including littering) is subject to fines and penalties. The Contractor shall establish construction site policy and educate all construction personnel.

All waste materials shall be collected and stored in a securely lidded, metal dumpster. The dumpster shall be rented from and emptied by a Georgia licensed solid waste management company. The dumpster shall meet all County, and State Solid Waste Management regulations and ordinances. The dumpster shall be emptied as necessary, and the material shall be hauled to a State licensed landfill. No construction debris shall be buried on the construction site. All personnel shall be informed and instructed regarding the correct procedure for waste disposal. Notices stating these procedures shall be posted in the construction office and the construction superintendent shall be responsible for insuring that these procedures shall be followed.

HAZARDOUS WASTE:

All hazardous waste materials shall be disposed of in a manner specified by Georgia State Solid Management regulations. All personnel shall be informed and instructed regarding the correct procedure for waste disposal. Notices stating these procedures shall be posted in the construction office and the construction superintendent shall be responsible for insuring that these procedures shall be followed.

SANITARY WASTE:

All sanitary waste shall be collected from the portable units, as necessary, by a Georgia State licensed sanitary waste management contractor, or as required by local regulations.

TEMPORARY FUELING TANK AREA:

Temporary fueling tanks shall have a Georgia E.P.D. approved secondary containment (liner system) basin to prevent and/or minimize site contamination. Temporary fueling tank locations shall located remotely from drainage ways, drainage systems, and state waters (streams, springheads, etc.).

EQUIPMENT MAINTENANCE AREA:

Equipment maintenance areas shall be clearly identified with signage. Said signage shall read as follows:

Equipment Maintenance Area

Discharge of new or used oil, fuel, lubricants, etc. is prohibited. Utilize containment/capture systems. Recycle used oils, contaminated fuels and lubricants. Illegal discharges are subject to fines and penalties.

Sign shall be weatherproof and have a minimum size of 36" X 36".

Equipment Maintenance Area(s) shall be located remotely from drainage ways, drainage systems, and state waters (streams, springheads, etc.).

STORM DRAIN LABELS:

Storm Drain Inlet Labels – Storm structure tops shall be stenciled with "**Protect our Water Quality, only rain down the Storm Drain**". The stenciling shall be performed as the inlet tops are installed and within one week after any "pour in place" structure top.

STORM WATER RUNOFF QUALITY CONTROLS:

The contractor shall conform to the phasing, sequencing, installation, inspection, maintenance, and stabilization requirements of the approved "Erosion, Sedimentation, and Pollution Control Plan". The contractor shall educate all construction personnel of the importance of limiting the area of construction disturbance through appropriate phasing and intermediate stabilization of areas that have reached appropriate grades. This includes installing perimeter areas of pavements and walks, proper and rapid seedbed preparation and installation of vegetation. The contractor shall work diligently to develop a construction mindset with the on-site personnel, which shall focus on the daily reduction of exposed land disturbance. This shall improve storm water quality due to vegetative stabilization, and also allows for more efficient construction activities during the winter "wet" season when pavement binder is in place for construction staging.

PART 2 - PRODUCTSTEMPORARY GRASSING MATERIALS:

Lime: Lime shall be finely ground limestone (Dolomite) containing not less than 85% of total carbonates and shall be ground to such a fineness that 98% will pass through a 20-mesh sieve and not less than 70% will pass through a 100-mesh sieve.

Fertilizer: Fertilizer shall be complete commercial slow release fertilizer type formula complying with State and Federal fertilizer laws. The fertilizer shall be free-flowing for application with spreading equipment and delivered to the site in the original, unopened containers, which shall bear the manufacturer's certificate of compliance covering analysis. The Architect shall be furnished with duplicate copies of invoices for all fertilizer used on the project. Fertilizer shall be the following:

10-10-10; 10% Nitrogen(N), 10% Phosphorus(P), 10% Potassium(K).

Ammonia Nitrate

Grass Seed: Provide fresh, clean, new-crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. Grass seed shall be labeled in accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of Invitation of Bids. Seed shall be furnished in sealed standard containers, unless exception is granted in writing by the Architect. Seed that has become wet, moldy, or otherwise damaged in transit or in storage will not be acceptable. Provide seed mixture composed of grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified.

Tall Fescue (Fescuta arundinacea) Seed: Fresh, clean, new seed testing 98% for purity and 85% for germination.

Annual Ryegrass (Lolium temulentum).Seed: Fresh, clean, new seed testing 98% for purity and 85% for germination.

Water: Water used in this work will be furnished by the Contractor and will be suitable for irrigation and free from ingredients harmful to plant life. The Contractor shall furnish hose and other watering equipment required for the work.

Bonded Fiber Matrix shall be comprised of a long strand, thermally produced wood fibers passing a freeness test at 760cc (MLS) level or below (>88% of total volume by weight) held together by organic tackifiers (10%) and mineral bonding agents (>2%) which upon drying, become insoluble and non-dispersible. The matrix which forms shall be designed, tested and proven to perform in a manner equal or superior to biodegradable erosion control blankets (ECB's). Documentation of testing at an independent university laboratory shall be provided which demonstrates superior performance as measured by reduced water runoff, reduced soil loss, and faster plant germination, as compared to erosion control blankets. The formed matrix shall meet the following requirements.

The material, when mixed into a liquid slurry, shall pass a free liquid quality control test (liquids separate from fibrous solids no greater than one inch in one minute's time as measured on a standard test board.)

The binder shall not dissolve or disperse upon rewetting.

The matrix shall have no holes > 1mm in size.

The matrix shall have no gaps between product and the soil.

The matrix shall have minimum water holding capacity of 1000g/100g (1.2 gal/lb matrix).

The matrix shall have no germination or growth inhibiting factors and shall not form a water insensitive crust.

The matrix shall be comprised of materials which are 100% biodegradable and 100% beneficial to plant growth.

FILTER FABRIC:

Silt fence shall be GA DOT - Type "C", approved silt fence:

TYPE FENCE	C
Tensile Strength (lbs. Min.) (1) (ASTM D-4632)	Warp – 120 Fill – 180
Elongation (% Max.) (ASTM D-4632)	40
AOS (Apparent Opening Size) (Max. Sieve Size) (ASTM D-4751)	#30
Flow Rate (Gal./Min./Sq.Ft.) (GDT-87)	70
Ultraviolet Stability (2) (ASTM D-4632 after 300 hours weathering in accordance with ASTM D-4355)	80
Bursting Strength (PSI Min.) (ATM D-3786 Diaphragm Bursting Strength Tester)	175
Minimum Fabric With (Inches)	36

FILTER STONE:

Filter stone shall be crushed stone conforming to the Department of Transportation - State of Georgia - Standard Specifications - Construction of Roads and Bridges - 2013 - Table 800.1, Size as shown on details.

EROSION CONTROL BLANKET:

Slopes > 3:1 (33% or greater)

Biodegradable netting impregnated with excelsior woodfiber such as manufactured by "Curlex";

"Ero-Mat" by Verdyol;

"Bon Terra CS2" (slopes > 3:1);

Slopes < 3:1 (33% or less)

"Bon Terra CS1"

North America Green S75

NON-WOVEN GEOTEXTILE FABRIC:

Non-woven geotextile fabric shall be GEOTEX 1341 as manufactured by Synthetic Industries, Inc. or approved equal. Fabric shall be 12.5 oz. per square yard.

POLYACRYLAMIDE:

Anionic Polyacrylamide shall be utilized on the project in emulsion form and gel bars/logs.

PART 3 - EXECUTIONEROSION AND SEDIMENTATION CONTROL:

Land Disturbance Activity Sequence shall be adhered to by the General Contractor.

Sedimentation Control: Sediment basins, diversion berms, silt dams, traps, barriers, downlines, check dams, rock filter dams, seep berms, mulching temporary grassing and appurtenances shall be installed and shall be maintained in-place for duration of construction, as shown and detailed on erosion control plan.

Silt fence: trench 6" deep along silt fence line layout.

Silt fence: bury one foot of fabric as detailed. In areas of concentrated flow, install multiple rows of silt fence or brace with 4 x 4 timbers and hogwire. (Refer to GA D.O.T. Standard and Specifications, Section 171).

The contractor shall provide erosion control check dams as shown and as per Georgia Department of Transportation Standards & Specifications, Section 162.

Erosion and sedimentation controls shall be maintained in a condition which will retain unfiltered water.

The Contractor shall construct the sedimentation ponds and control devices prior to clearing and grubbing the site to insure complete silt control.

When the silt or the debris level is greater than 1 foot above the bottom of the pond, the contractor shall remove the silt or debris to restore the proper elevation for the bottom of the pond.

The Contractor shall have all erosion and sedimentation control devices in service and operating properly prior to completion and final acceptance of the contract.

Responsibility: The Contractor shall be solely responsible for insuring that no silt or debris leaves the immediate construction site. Any silt area disturbed shall be returned to its natural state as directed by the Architect at the Contractor's expense.

The Contractor has the option to submit additional control measures in the form of shop drawings.

Temporary seeding shall be provided for all exposed soil surfaces that are not to be fine graded or landscaped within fourteen (14) calendar days. The contractor shall anticipate multiple temporary seeding applications during the project construction period.

Temporary seeding shall be applied to any and all disturbed areas left idle for two weeks and shall be applied no later than the 15th calendar day from last land disturbance activity. (ie. clearing, grubbing or grading).

Contractor shall provide temporary grassing and mulching for all disturbed areas within seven (7) calendar days of reaching finished grades. Contractor shall reduce area of disturbance daily through use of temporary grassing and mulching.

GRADING OPERATIONS:

Grading Operations: Grading operations shall be phased. Grading operations shall be scheduled so that the ground surface will be disturbed for the shortest possible time before permanent construction is installed. Large areas shall be maintained as flat as possible to minimize soil transport through surface flow. Contractor shall immediately install graded diversion channels, ditches and berms to direct storm runoff to sediment and filtering basins. Contractor shall grade fill slopes in a manner which prevents surface areas from flowing over newly constructed fill slope areas through shaping and providing required temporary downlines or diversions to permanent storm structures as construction allows.

Storm Drainage System: As much of the permanent storm drainage system as practical shall be initially installed and surface water diverted into the system. Contractor shall provide the required temporary inlet sediment traps immediately. Temporary inlet sediment traps shall be immediately installed as base of structure is set and shall be adjusted up periodically as the grading operation raises the grades around the structure. The storm drainage system shall be completed as soon as conditions will allow.

Temporary sediment barriers shall be maintained around drainage structures until final subgrade preparation has begun.

Ground Cover:

All exposed soil shall be protected by application of ground cover.

Ground cover may consist of any effective erosion preventative treatment such as straw or other mulches, planting, etc. See Section 024800 for GRASSING.

All grassing or planting operations shall include mulching as stabilization until ground cover by planting is effective.

STABILIZATION PRACTICES:

The Contractor shall be responsible for controlling soil erosion during all phases of construction, not only to preserve and protect slopes, drainage structures, pavement, and other facilities, but also to reduce potential sources of water pollution and damage to adjacent property.

Mulching: Contractor shall apply dray straw or hay and/or wood chip mulch to disturbed areas at a depth of two to three inches. Said mulch shall be uniformly applied by hand or mechanical equipment. Straw or hay mulch shall be pressed into the soil with a disk harrow with disk set straight or with special "Packer Disk". The edge of the disk should be dull enough not to cut the mulch but to press it into the soil leaving much of it in an erect position. Straw or hay mulch shall be anchored immediately after application.

Polyacrylamide (PAM): Contractor shall utilize anionic polyacrylamide as a temporary soil binding agent to reduce soil erosion. PAM is available in emulsions, powders and gel bars or logs. PAM shall be utilized in conjunction with other "best management practices". PAM shall be utilized in direct soil surface applications where the timely establishment of vegetation is not feasible (including building pad and parking lot areas). PAM shall be applied in conjunction with temporary seeding efforts or as a separate hydro spray application. The maximum application of PAM, in pure form, shall not exceed 200pounds/acre/year. Contractor shall install a PAM gel bar or log in each storm structure (secured with rope) and replace at the manufactures recommended interval. Contractor shall apply PAM via hydrospreader to all disturbed areas once per fourteen (14) calendar days at the rate of seven and one half (7.5) pounds per acre. Provide written certification, signed by the General Contractor and Subcontractor applying material, of each application. Certification shall include a copy (small scale) of a site drawing indicating the area covered by the certification.

Temporary Stabilization: Topsoil stockpiles and disturbed areas of the site, where construction activity has ceased for at least fourteen (14) calendar days, shall be stabilized with temporary seeding and/or mulch.

Lime and Fertilizer Rates: Lime shall be applied at a rate of one (1) ton per acre and commercial fertilizer 6-12-12 shall be applied at the rate of 500 to 700 pounds per acre, disturbed areas being prepared for planting.

Seed Bed Preparation for Temporary Vegetation: Loosen ground surface by discing, raking or harrowing. If the area has been recently loosened or disturbed, no further roughening shall be required. Remove all large clods, boulders and debris that will interfere with the work. Remove all stones 2" and larger in any given dimension.

Planting of Temporary Vegetation (Hydroseeding): Disturbed areas shall be seeded with Tall Fescue or Annual Ryegrass. Apply Tall Fescue at the rate of fifty (50) pounds per acre. Apply Annual Ryegrass at a rate of forty (40) pounds per acre. Disturbed areas shall be planted with a hydro-seeder after areas have been prepared for seeding, unless plans show otherwise. Existing trees and shrubs in hydro-seeded area shall be protected during hydroseeding. Apply seed, fertilizer, lime, and fiber in one application. Temporary vegetative cover shall be maintained by the Contractor until the permanent lawn season, at which time the tall fescue or annual ryegrass shall be mowed down to the ground surface, the lawn area disc harrowed, the soil prepared for planting lawns and the permanent lawn planted or sodded as called for on the plans. (Refer to Section 024800 – Permanent Grassing for planting of permanent lawns.)

Planting Seasons:

* Denotes optimum Planting Season

Tall Fescue: August 15 - November 1 (*September 1 – October 15)

Annual Ryegrass: August 1 - April 15 (*September 1 – December 10).

Reseeding – Reseed and provide straw cover for bare areas 1 s.f. and larger to establish and maintain vegetative cover and to prevent sheet and rill erosion. Repair erosion damage as required and reseed.

Matting and Mulching – All seeding shall be covered with matting and/or mulch. After seeding, all slopes that exceed 3'(H): 1'(V) shall be covered with erosion control matting and/or blankets. The mats and/or blankets shall be installed as per the manufacturer's recommendations and specifications using the recommended fastening hardware. Remaining seeded areas shall be covered with straw or hay spread at the rate of approximately two tons/acre or wood cellulose fiber applied at the rate of approximately 1500 lbs./acre. Areas of the site that are to be paved shall be stabilized through the proper compaction of the soil and placement of a graded, stone aggregate base.

Rolling – Roll all seeded areas with roller weighing 60 to 90 pounds per linear foot of roller before applying mulch. On steep slopes cover seeds by dragging spiked chains or similar methods.

Watering – Provide watering as required to establish and maintain healthy vegetative cover.

Permanent Stabilization – Disturbed areas of the site where finished grade has been achieved, and construction activity has ceased for at least fourteen (14) calendar days, shall be stabilized with season dependant permanent seeding. The permanent seed mixture shall consist of ten (10) pounds per acre of Hulled Sierra Bermuda Grass, and ten (10) pounds per acre of Un-hulled Sierra Bermuda Grass. The seed mixture shall be hydro-seeded with a tank mixture of Polyacrylamide (PAM) and a tackifier. Polyacrylamide (PAM) application shall not exceed the rate as outlined in the "Manual for Erosion and Sediment Control in Georgia", Latest Edition. Per acre, shall be applied to the disturbed areas. After seeding, all slopes that exceed 3'(H): 1'(V) shall be covered with erosion control matting and/or blankets. The mats and/or blankets shall be installed as per the manufacturer's recommendations and specifications using the recommended fastening hardware.

The Contractor shall be responsible for completing all permanent erosion control features at the earliest practical time. Temporary measures shall be used until permanent measures are completed.

Where erosion control facilities have been constructed, the Contractor shall maintain and restore such facilities as necessary to insure proper functioning. After construction has been completed; remove sediment from erosion control facilities and grade the areas.

It shall be the Contractor's responsibility to maintain all access to the site in such manner as to prevent mud from washing or being tracked onto existing pavements. The Contractor shall provide a temporary hose bib system to wash truck tires or provide a water truck with a pressure hose for wash down of trucks and equipment entering the public right-of-way as necessary.

Bonded Fiber Matrix (BFM) shall be installed by a Contractor certified by the manufacturer to be trained in the proper procedures for mixing and application of the product. The BFM shall be mixed according to manufacturer's recommendations and contractor shall demonstrate "free liquid" test to inspector upon request. Bonded Fiber Matrix shall be spray-applied at a rate of 3,000 - 4,000 lb/acre, utilizing standard hydraulically seeding equipment in successive layers as to achieve 100% coverage of all exposed soil. The BFM shall not be applied immediately before, during or after rainfall, such that the matrix will have opportunity to dry for up to 24 hours after installation. BFM shall be utilized for both temporary vegetation and permanent vegetation.

STRUCTURAL PRACTICES:

Temporary Construction Entrance – A stabilized, stone aggregate construction entrance shall be constructed, as per the detail set forth in the Manual for Erosion and Sediment Control in Georgia, Latest Edition. The temporary construction entrance shall reduce vehicle tracking of sediments. Out-going trucks shall have the tires washed prior to exiting the site onto any public street or right-of-way. Any mud, dirt, or rock that is tracked onto public streets shall be swept immediately and material placed within the perimeter controls.

Sediment Basins – Temporary sediment basins shall be constructed to contain and filter sixty-seven (67) cubic yards of sediment per disturbed acre within that drainage basin. The temporary sediment basin shall be constructed as per the approved Erosion, Sedimentation, and Pollution Control Plan(s) and Details and as per the detail(s) set forth in the Manual for Erosion and Sediment Control in Georgia, Fourth Edition.

Silt Barriers – A single row of Ga. DOT Type "C" Silt fence shall be installed along the toe of all downstream slopes and a double row of Type "C" Silt Fence shall be installed adjacent to all state waters buffers; as per the Manual for Erosion and Sediment Control in Georgia, Latest Edition.

Temporary Diversion Berms/Dikes – Temporary Diversion berms/dikes shall be constructed as per the approved Erosion, Sedimentation, and Pollution Control Plan. The diversions shall be minimum six feet wide and shall be raised each day with finish grade during grading activities. The diversions shall be constructed to intercept and redirect runoff to the temporary sediment basin(s) and/or temporary storm drainage structure sediment inlet traps prior to the runoff reaching the perimeter sediment controls.

DUST CONTROL:

The Contractor shall keep airborne dust to a minimum by using water sprinkling or tossing and/or other suitable means to limit dust and dirt from rising and scattering in the air. Contractor shall water all disturbed earth no later than five (5) days from last rain or last watering.

POLLUTION AND SPILL PREVENTION:

The Contractor shall make every effort to control both air and water pollution. No tires, oils asphalt, paint or coated metals are permitted in combustible waste piles. Pollutants such as fuels, lubricants, bitumens, raw sewage and other harmful materials will not be discharged into or near rivers, streams or man-made channels. Equipment maintenance shall be performed with containment and capture of used oil. Contractor shall not pour or drain used lubricants or other necessary mechanical fluids onto the ground. Remove from site and deliver to a recycling center.

Material Management Practices:

The following material management practices shall be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff. The Contractor shall follow good housekeeping practices onsite during the construction project.

An effort shall be made to store only enough product required to do the job.

All materials stored onsite shall be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.

Products shall be kept in their original containers with the original manufacturer's label.

Substances shall not be mixed with one another unless recommended by the manufacturer.

Whenever possible, all of a product shall be used up before disposing of the container.

Manufacturer's recommendations for proper use and disposal shall be followed

The site superintendent shall inspect daily to ensure proper use and disposal of materials onsite.

Hazardous Products:

The Contractor shall use the following practices to reduce the risks associated with hazardous materials:

Products shall be kept in original containers unless they are not resealable.

Original labels and material safety data shall be retained with the product by the General Contractor. They contain important product information.

Surplus products shall be disposed of following and in conformance with local and State recommended methods.

Product Specific Practices:

The following product specific practices shall be followed for products stored on-site:

Petroleum Products:

All on-site vehicles shall be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products shall be stored in tightly sealed containers that shall be clearly labeled and stored in a clearly identified area. Any asphalt substances used on-site shall be applied according to the manufacturer's recommendations.

Fertilizers:

Fertilizers used shall be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer shall be worked into the soil to limit the exposure to storm water. Any fertilizers that are to be stored on-site, shall be stored in a protected, securable enclosure. The contents of any partially used bags of fertilizers shall be transferred to a clearly labeled sealable plastic container to avoid spills.

Paints:

All containers shall be tightly sealed and stored when not required for use. Excess paint shall not be discharged to the storm sewer system but shall be properly disposed of according to local and State regulations.

Concrete:

Concrete trucks shall be allowed to wash out, discharge, and drum wash only at the identified equipment maintenance area(s). Maintenance areas shall be equipped with a discharge containment area (e.g., earth berms surrounding area). The containment area shall be cleaned up and removed from the site upon completion of concrete installation work.

SPILL PREVENTION AND CLEANUP:

The following practices shall be followed for spill prevention and cleanup:

Local, State, and Manufacturer's recommended methods for spill cleanup shall be clearly posted and site personnel shall be made aware of the procedures and the location of the information and cleanup supplies.

Materials and equipment necessary for spill cleanup shall be kept in the material storage area on-site. Equipment and materials shall include but not be limited to brooms, dustpans, mops, rags, gloves, goggles, respirators, cat litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.

All spills shall be cleaned up immediately upon discovery.

The spill area shall be kept well ventilated and personnel shall wear the appropriate protective clothing to prevent injury from contact with a hazardous substance.

Spills of toxic or hazardous material shall be reported to the appropriate local or State government agency, regardless of size.

The spill prevention plan shall be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures shall also be included.

The Contractor shall be responsible for assigning personnel to be responsible for spill prevention and cleanup coordination. The Contractor shall designate, at a minimum, three site personnel to receive spill prevention and cleanup training. These individuals shall each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel shall be posted in the material storage area and in the on-site construction office.

MAINTENANCE:

Inspect slope protection and erosion control elements after each rainfall. Clear all debris and accumulated sediment from behind barriers when one third full so their functional capacity is not reduced during the construction period.

REMOVAL OF TEMPORARY EROSION CONTROL DEVICES:

As soon as permanent vegetative cover is established, Contractor shall remove temporary devices, including sediment barriers, berms, silt traps and similar devices. Contractor to remove retrofit structure and clean out all accumulated silt and debris in detention ponds to finished grades indicated on the drawings.

Remove all debris resulting from temporary erosion control from project site.

Control dust from disturbed areas by means of mulching, irrigation, calcium chloride or other method subject to the architect's review.

End of Section 025400

SECTION 027100 - FOUNDATION DRAINAGEPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work specified in this section.

DESCRIPTION OF WORK:

Extent of foundation drainage system work is shown on drawings. Drainage system applies to below grade building walls and exterior site retaining walls.

Foundation drainage work includes the following:

Footing drainage system.

Prefabricated in-plane wall drainage system.

SUBMITTALS:

Certification: Submit Certification signed by Contractor and foundation drainage system installer that installed materials conform to specified requirements and system was successfully checked and tested prior to covering with filtering and drainage fill.

PART 2 - PRODUCTSDRAINAGE PIPE AND FITTINGS:

Furnish drainage pipe complete with bends, reducers, adapters, couplings, collars, and joint materials.

Polyvinyl Chloride Pipe Schedule 40: ASTM D 2729.

SUBSURFACE DRAINAGE MAT:

General: Provide prefabricated in-plane wall drainage matting as part of overall foundation drainage system.

Waterproofing Protection: In-plane drainage mat shall be used on all vertical surfaces to protect membrane against backfill and used on horizontal surfaces which bear traffic and will not immediately be covered with the wearing surface. Coordinate with waterproofing.

Drainage Core: Manufacturer's standard three-dimensional, non-biodegradable, plastic material designed to effectively conduct water to foundation drainage system.

Filter Fabric: Manufacturer's standard non-woven geotextile fabric of polypropylene or polyester fibers, or a combination thereof.

Products: Subject to compliance with requirements, provide one of the following:

"Amerdrain 4545"; American Wick Drain Corp.

"Enkadrain 9010 or 9020"; American Enka Co.

"Miradrain"; Mirafi, Inc.

"Erolan"; Armortec, Inc.

"Hydraway 100"; Monsanto

SOIL MATERIALS:

Impervious Fill: Clay gravel and sand mixture capable of compacting to a dense composite.

Drainage Fill: Evenly graded mixture of natural or crushed gravel or crushed stone and natural sand with 100% passing a ½" sieve and 0-5% passing a No. 50 sieve.

Filtering Material: Evenly graded mixture of natural or crushed gravel or crushed stone, and natural sand, with 100% passing a 1-½" sieve and 0-5% passing a No. 50 sieve.

PART 3 - EXECUTION

INSTALLATION:

Impervious Fill at Footings: After concrete footings have been cured and forms removed, place impervious fill material on subgrade adjacent to bottom of footing. Place and compact impervious fill to dimensions indicated or, if not indicated, not less than 6" deep and 12" wide.

Filtering Material: Place supporting layer of filtering material over compacted subgrade where drainage pipe is to be laid to depth indicated or, if not indicated, to a compacted depth of not less than 4".

After testing drain lines, place additional filtering material to a 4" depth around sides and top of drains.

Laying Drain Pipe: Lay drain pipe solidly bedded in filtering material. Provide full bearing for each pipe section throughout its length, to true grades and alignment, and continuous slope in direction of flow.

Lay perforated pipe with perforations down and joints tightly closed in accordance with pipe manufacturers recommendations. Provide collars and couplings as required.

Testing Drain Lines: Test or check lines before backfilling to assure free flow. Remove obstructions, replace damaged components, and retest system until satisfactory.

Subsurface Drainage Mat: Coordinate placement of drainage mat with other foundation drainage materials. Drainage mat shall be used on all retaining walls, site and building.

Comply with manufacturer's instructions for securing matting to substrate. Use adhesives and mechanical fasteners as recommended by matting manufacturer. Lap all edges of fabric and extend fabric around foundation drainage pipe in accordance with mat manufacturer's recommendations. Protect in-place matting during backfill operations in accordance with matting manufacturer's instructions.

Drainage Fill: Place drainage fill over drain lines after satisfactory testing and covering of drain lines with filtering material. Completely cover drain lines to a width of at least 6" on each side and above top of pipe a minimum of 24". Place fill material in layers not exceeding 3" in loose depth and compact each layer placed.

Overlay drainage fill material with one layer of synthetic drainage fabric, overlapping edges at least 12".

Fill to Grade: Apply impervious fill material over compacted drainage fill at footing drains, placing material in layers not exceeding 6" in loose depth and thoroughly compacting each layer. Carry impervious fill to indicated finish elevations and slope away from building perimeter.

End of Section 027100

SECTION 027200 - SITE DRAINAGEPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of site drainage work is shown on drawings.

Site drainage work includes, but is not limited to, the following:

Storm sewer conduits.

Manholes, frames and covers.

Catch basins, frames, gratings, headwalls.

Comply with the requirements of applicable Division 2 sections for excavation and backfilling required in connection with site drainage work.

Refer to Division-3 sections for concrete work required for site drainage systems.

QUALITY ASSURANCE:

Installer: A firm specializing and experienced in sewer collection system work for not less than 2 years.

STANDARD SPECIFICATIONS:

All work and materials pertinent to this Section of the Specifications are to be in accord with applicable Sections and Paragraphs of Georgia Department of Transportation Standard Specifications, Construction of Roads and Bridges, 2013 Edition, hereafter referred to as DOT Specifications, except for deviations required by the local Public Works Department, shown on the plans, or as specified herein. Except for such deviations, referenced Specifications shall govern, shall be considered a part of the detailed Specifications, and shall have the same force and effect as if they had been included herein in complete language and detail.

Contractor shall obtain from Georgia Highway Department a copy of the latest revised issue of the "Standard Specifications" and shall keep a copy available for reference at job site at all times while sewer construction is in progress.

Ordinances: Comply with all applicable codes and ordinances of the County Public Works Department. Refer to General Conditions Section.

Protection of Existing Facilities: Contractor shall maintain in operating condition all existing surface or subsurface utilities and repair or have repaired to the satisfaction of the Architect any damage done to existing utilities during the course of the work.

SUBMITTALS:

Contractor shall provide shop drawings for all site drainage materials for approval.

Submit testing results for HDPE pipe for each type and size to be used, verifying conformance for weight, material distribution pipe dimensions, water inlet area, pipe stiffness, pipe flattening, brittleness, environmental stress crack resistance, workmanship markings (per AASHTO), manufacturing plant.

Record Drawings: At project closeout, submit record drawings of installed site drainage piping(including lengths and slopes), layout, inverts, top elevations, and products, in accordance with requirements of Division 1. Conform with and provide drawings as necessary to satisfy Local Planning and Development Department "Certificate of Development Conformance" (CDC).

DELIVERY AND STORAGE:

Contractor shall store materials properly on site. Unload and handle thermoplastic pipe with care. Damaged materials shall be removed from the site and replaced.

PART 2 - PRODUCTS

CONDUIT MATERIALS:

General: Furnish ells, tees, reducing tees, wyes, couplings, increasers, crosses, transitions and end caps of same type and class of material as conduit, or of material having equal or superior physical and chemical properties as acceptable to the Architect/Engineer.

Pipe: See drawings for location and type of pipe.

Smooth Interior Pipe:

Concrete pipe shall be reinforced Class IV. All applicable articles and paragraphs under Storm Sewers, DOT Specifications shall apply.

Aluminized steel type 2 shall meet AASHTO M274.

<u>16 Gauge Pipe Diameter</u>	<u>14 Gauge Pipe Diameter</u>	<u>12 Gauge Pipe Diameter</u>
12"	30"	54" and larger
15"	33"	
18"	36"	
21"	39"	
24"	42"	
27"	48"	

Provide integral bell-n-spigot or exterior bell-n-spigot joints. Provide "O" ring gaskets.

Polyvinyl chloride Pipe shall be Schedule 40 with matching fittings conforming to the requirements of ASTM D1785 or polyvinyl chloride corrugated pipe with a smooth interior conforming to the requirements of ASTM F949.

Appurtenance Material:

Concrete shall have a minimum compressive strength of 3000 psi. at 28 days.

Mortar for masonry work in storm sewer structures shall be 1:2 cement sand mix. Cement shall be High Early strength American Portland Cement, conforming to the latest ASTM Specifications. Sand shall be clean and sharp, free from all deleterious substances and shall contain not more than 5% by volume of material passing No. 100 sieve.

Brick shall be clay or shale Hard No. 1 building brick.

Castings: All curb inlet castings shall be gray iron, conforming to Georgia Highway Specifications.

All castings shall be heavy duty (H-20 loading) bicycle safe type.

Other materials required to completely install storm sewers in accord with these Specifications shall conform to requirements of DOT Specifications.

Approval of Manufacturer: Material shall be new, and approval of type and manufacturer of all material shall be obtained from Architect prior to delivery of any material.

Construction Equipment: Provide and maintain in good operating condition approved equipment capable of performing in accord with Specifications all excavation, laying of pipe, backfilling, compacting, and any other work required.

INSTALLATION:Construction Stakes:

Storm sewer materials shall be installed to line and grade established by General Contractor.

Contractor shall verify all lines and grades before commencing any digging operation.

Excavation:

Trenching, sheeting bracing work shall be done as required to protect all persons, property and buildings.

Pipe beddings shall be as per Georgia Department of Transportation Standards.

Excavate all rock a minimum of 4" below pipe at all points and of width 6" outside of pipe on each side. Refer to Division 2 Sections for definition of rock and basis of payment.

Laying Pipe: Storm sewer pipe to be laid in accord with the Storm Sewer Sections, DOT Specifications.

Integral Bell-N-Spigot: The bell shall overlap a minimum of two (2) corrugations of the spigot end when fully engaged. The spigot end shall have an "O"-Ring gasket that meets ASTM F 477, "Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe".

Exterior Bell-N-Spigot: The bell shall be fully welded to the exterior of the pipe and overlap the spigot end so that flow lines and ends match when fully engaged. The spigot end shall have an "O"-Ring gasket that meets ASTM F 477, "Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe".

Appurtenances:

Curb Inlets, Weir Inlet, Drop Inlets, and Manhole: To be constructed as shown in detail sheet. Refer to site plan for location and size.

Contractor shall connect all down spout lines to storm drainage system as detailed.

Line Marker: During back-filling/top-soiling of site drainage systems, install continuous underground-type plastic line marker, located directly over buried line at 6" to 8" below finished grade.

All PVC pipe below grade outside the building shall be continuously wrapped with a metallic line marker tape or copper wire, brought to the surface at the pipe terminations for use by utility locators.

Backfilling of sewer ditches and appurtenances shall be in accord with DOT Specifications. Percent of compaction to be in accord with compaction as specified in Earthwork Section.

Compaction Tests: Compaction tests shall be made in trench backfill to determine the compaction being achieved. All tests shall be made as specified in Section 022000.

Cleaning Piping: Clear interior of piping of dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull past each joint as it is completed.

DETENTION/WATER QUALITY FACILITY RECORD AS BUILT DRAWING(S) and SWM REPORT:

Contractor shall secure triplicate original stamped and signed certificate copies and drawing by a Georgia-licensed land surveyor, executed on the form provided below to be submitted with the Record Drawing as part of required Close-out Documents.

Drawing Information Required:

1. All contours and elevations.
2. Bottom of basin elevation in front of outlet device and opposite end of basin to verify drainage.
3. Invert of pipes at head walls discharging into facility.
4. Top of wall or dam elevation to verify freeboard.
5. Width of dam (if applicable) at top of dam.
6. Maximum ponding elevation and limits of ponding.
7. Location of pond with respect to road right-of-way, property lines, and other easements.
8. Detail of outlet device; show all elevations and dimensions.
9. Date of record survey.
10. Registered surveyor's seal and signature.

**** ENGINEER'S CERTIFICATE ****

AS-BUILT STORMWATER DETENTION/WATER QUALITY FACILITY

I, _____, a registered Professional Engineer in the State of Georgia, hereby certify that the storm water detention facility (facilities) for the project known as

_____ (Project Name)

lying in Land Log _____ of the _____

District, Gwinnett County, Georgia has (have) been constructed to approved plans and specifications and in accordance with the Contract requirements.

This is the _____ day of _____, 20_____.

SAMPLE

Georgia Registration No. _____

End of Section 027200

SECTION 028300 - CHAIN LINK FENCINGPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to the work of this section.

SUBMITTALS:

Product Data: Submit manufacturer's technical data, and installation instructions for metal fencing and gates.

PART 2 - PRODUCTS

Type "A" Fencing: Type A fence and gates shall have a fabric height of six (6) feet with top rail and selvage knuckled top and bottom.

Fabric: Fabric shall be continuous galvanized chain link 11-½ gauge woven wire with selvage knuckled top and bottom.

Posts: All posts used in the construction of this fence shall be hot-dipped galvanized schedule 40 pipe conforming to ASTM A-120 or SS-40 with a zinc coating of 0.9 oz./sq.ft. with a chromate conversion coating and then a polyurethane acrylic coating of no less than 0.3 mils dry film thickness. The SS-40 shall also have a zinc rich interior coating of not less than 0.3 mils dry film thickness.

Terminal Posts: Terminal, corner and pull posts shall be 3" O.D. Schedule 40 pipe weighing 5.79 lbs./lin. ft. Terminal posts shall be installed at every point that fence changes grade or turns a corner.

Line Posts: Intermediate line posts shall be Schedule 40, 2-¾" O.D. pipe, 3.65 lbs./lin.ft. All line posts to be evenly spaced at maximum spacing of 10'-0" O.C.

Top Rail: Top rail shall be 1-⅝" O.D. Schedule 40 pipe weighing 2.27 lbs./lin. ft. All joints to be swedge type. Top rails shall pass through line post tops and be fastened to terminal posts by pressed steel connectors. Top rail shall be kept parallel to ground, uneven top rail will not be accepted.

Tension Wire: Tension wire shall be 7 gauge coated steel.

Braces: Braces shall be same as top rail and installed midway between top rail and bottom of fabric. Braces shall be fastened to posts with pressed steel connectors. Truss with ¾" rod with turnbuckle. Braces to be installed between each terminal post and to adjacent line post each way.

Fabric Connections: Fabric shall be fastened to terminal posts with 3/16"x 3/4" tension bars with 11 gauge 7/8" wide steel bands fastened at 24 " 0. C. Fabric shall be fastened to line posts and top rails with tie wires of aluminum alloy of 0.144 inch diameter. Line posts to be tied at intervals not exceeding 15" and top rails not exceeding 24".

All terminal, corner, and pull posts to be of sufficient length to extend 36" into a 12" diameter concrete footing and all line posts shall be set in concrete footings with a depth of 36" and diameter of 10".

Miscellaneous fittings shall be furnished as needed and shall be galvanized.

Miscellaneous athletic or other fencing not specified above shall be as noted on the drawings.

DRIVE AND PASSAGE GATES:

Double traffic gates shall be 12'-0" wide. Gate frames shall be constructed of Schedule 40, 1-5/8" O.D. pipe, 2.27 lbs. per linear foot with heavy comer fittings of welded or pressed steel fabric shall be same as fence. Hinges to be of malleable or pressed steel. All gates shall have positive latching device with padlock provision, center plunger rods, catch, and outside catch to secure gate in open position. Posts shall be Schedule 40, 3" O.D. pipe, 5.79 lbs./lin-ft. Posts shall be of sufficient length to extend 36" into a 12" diameter concrete footing.

Fabric to be same as fencing.

Double walk gates shall be 6'-0" wide. Specifications to be the same as 12'-0" double gate.

Single walk gates shall be 4'-0" wide. Gate Frame shall be constructed of 1-5/8" O.D. Schedule 40, weighing 2.27 lbs./lin. ft.

Fabric to be same as fence.

Miscellaneous fittings shall be furnished as needed and shall be galvanized.

Security traffic gates shall be as detailed on the drawings.

PART 3 - EXECUTION

INSTALLATION:

Do not begin installation and erection before final grading is completed, unless otherwise permitted.

Excavation: Drill holes for posts in firm, undisturbed, or compacted soil.

Setting Posts: Center and align posts in holes 3" above bottom of excavation.

Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

Top Rails: Run rails continuously through post caps, bending to radius for curved runs. Provide expansion couplings as recommended by fencing manufacturer. Top rail shall be installed parallel to the ground.

Brace Assemblies: Install braces so posts are plumb when diagonal rod is under proper tension. Install braces between each terminal post and adjacent line post each side.

Fabric: Leave approximately 2" between finish grade and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

Tension wire: Install tension wire at bottom of all fencing.

Gates: Install gates plumb, level and secure for full opening without interference. Install ground-set items in concrete for anchorage, as recommended by fence manufacturer. Adjust hardware for smooth operation and lubricate where necessary.

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

End of Section 028300

SECTION 033100 - CONCRETEPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

The extent of concrete work shown on drawings.

QUALITY ASSURANCE:

Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:

ACI 318-11, except as modified herein.

"Design Handbook" 10th Edition, 2008 of the Concrete Reinforcing Steel Institute, except as modified herein.

Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code-- Reinforcing Steel."

TESTS:

At least one slump test shall be made and one set of test cylinders shall be taken from each 75 cubic yards of concrete. At least one slump test shall be made and one set of test cylinders shall be taken for each day's pour of less than 50 cubic yards of concrete.

Sampling shall conform to ASTM C172-08.

Slump tests shall conform to ASTM C143-10.

Compression test specimens shall be made and cured in accordance with ASTM C31-98. Contractor shall protect test cylinders from injury.

A set of test cylinders shall consist of a minimum of 4. One (1) cylinder shall be broken at 7 days and three (3) cylinders at 28 days. No 28 day test (average of 3 cylinders) shall fall below the specified strength.

Failure to comply with the required evaluation procedure shall constitute questionable concrete, and additional tests shall be made at no cost to the Owner in accordance with the provisions of ACI Building Code except that core tests shall be made prior to load tests wherever practicable. If core tests fail to demonstrate the strength required by the Contract Documents, then the Architect may, at his discretion, require load tests or remedial measures. Load tests shall be made in accordance with the ACI Building Code. All core tests or load testing shall be paid for by the Contractor.

Cost of slump tests and sampling, moulding, storing, curing, and transporting concrete test specimens shall be paid by the OWNER. The cost of laboratory services for the testing of compression specimens made during the placing of the concrete shall be paid by the OWNER.

Note: Retest of concrete placed by the contractor and not meeting specified requirements shall be at the contractor's expense.

Refer to the General Conditions (GCPS-General Conditions, Revision VIII, dated 8/30/13). In the event that tests reveal the concrete does not meet the requirements of the Specifications, all costs for the removal of the unsatisfactory materials, the replacement and re-testing thereof shall be borne by the contractor.

Contractor shall furnish in writing the following information to the testing laboratory and the testing laboratory's report shall contain this information:

Accurate and detailed description of the locations of all concrete from which test cylinders are representative, slump, date, and time of sampling, person who sampled, truck number, time batched, temperature, and weather condition, temperature of concrete, specified concrete strength, and design mix. In the event of any low strength cylinder results, the testing laboratory shall immediately report the type of failure to the Architect.

The Contractor shall keep at the job site white background prints on which he shall mark the areas for which each concrete test is representative. This print shall be used for no other purpose. Prints will be furnished to the Contractor by the Architect.

SUBMITTALS:

Shop Drawings: Submit to the Architect placing plans, bending details, and bar lists covering all reinforcing steel. All dimensions shall be shown on the shop drawings. All details and notes appearing on the contract drawings, and giving information for the placing of reinforcing steel, shall be shown on the shop drawings. Schedules shall be of the same general type shown on the drawings. Location and arrangement of accessories shall be clearly shown.

All wall reinforcing shall be shown in elevation. Reproductions of Contract Drawings shall not be used for Shop Drawings. The General Contractor shall check shop drawings for conformance to Contract Drawings and shall indicate this by affixing his initials to each sheet.

Reinforcing steel and accessories shall be detailed in accordance with ACI 315 (Manual of Standard Practice for Detailing Reinforced Concrete Structures) and CRSI MSP-1 (Manual of Standard Practice), latest editions.

Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Design and engineering of formwork are Contractor's responsibility.

Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing re-shoring.

Welding Certificates: Copies of certificates for welding procedures and personnel.

Concrete Mix Designs: Submit all mix designs for approval by Architect and engineer.

PART 2 - PRODUCTS

CLASSES OF CONCRETE:

Class A, standard weight (unless otherwise noted):

Minimum strength - 3000 psi at 28 days, as indicated below.

Slump - 3 to 5 inches max for regular mix with super plasticizer admixtures increasing slump to 10" max.

Concrete air entrainment shall be 4.5% to 7.5% for exterior slabs, and 0% to 3% for interior slabs.

Maximum water content - 7 gallons per bag of cement.

Minimum cement content - 5.75 bags per cubic yard.

Concrete produced above 70 Degrees F shall contain an ASTM C494 Type D Admixture.

Use: Footings - 3000 psi

Interior Slab on Grade - 3000 psi

Piers - 3000 psi

Walls - 4,000 psi

Elevated slabs - 4000 psi

NOTE: Fly-ash shall not be permitted.

PROPORTIONING AND DESIGN OF MIXES:

Submit to the Architect for review a design mix for each class of concrete prior to placing any concrete. Design mix shall be based on the maximum slump for each class of concrete to be used on the job. Concrete with slump in excess of that produced by verification test of design mix shall be rejected. Design mix to be paid for by the Contractor.

NOTE: The use of slag in the concrete design mix must be approved by Prior Approval during the Bidding process and must be accompanied by accurate documentation of the curing process.

Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

CONCRETE MIXES:

Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.

Delete references for allowing additional water to be added to batch for material with insufficient slump. Addition of water to the batch **will not** be permitted.

During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

When air temperature is between 85 deg. F (30 deg. C) and 90 deg. F (32 deg. C), reduce mixing and delivery time from 1-½ hours to 75 minutes, and when air temperature is above 90 deg. F (32 deg. C), reduce mixing and delivery time to 60 minutes.

The Producer shall furnish delivery ticket with each load of concrete delivered under this specification. The delivery ticket shall show clearly the class and the strength of concrete, design mix, and time batched. Contractor shall file copies of delivery ticket on job.

REINFORCING STEEL:

Reinforcing bars shall conform to ASTM A615-09 (S1), Grade as shown on the Contract Drawings.

Welded wire fabric shall conform to ASTM A185-07.

Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.

Accessories shall conform to CRSI's "Manual of Standard Practice". Bar supports for exposed slabs or beams shall be plastic or have plastic encased legs, having ¼ inch of plastic between the ends of metal legs and the form or exposed surface of the concrete.

At the time concrete is placed, reinforcement shall be free from dirt, loose rust, loose scale or other coatings which will reduce bond.

All bars shall be bent cold.

No bars partially embedded in concrete shall be field bent, except as noted on Contract Drawings.

Reinforcement shall be accurately placed and secured in position by concrete, metal or plastic chairs spacers or ties.

No splices shall be made except as shown on Contract Drawings or in temperature reinforcing or horizontal wall reinforcing, because of available bar lengths.

Splices in reinforcing bars shall be 48 diameters, except as otherwise shown on Contact Drawings.

Provide shop fabricated corner bars.

Splices in welded wire fabric shall be 8 inches, minimum.

Where not otherwise shown on the Contract Drawings, cover for reinforcement shall be as follows:

Footings	3" clear, top, sides and bottom.
Slabs	$\frac{3}{4}$ " clear, top and bottom.
Columns and piers	2" clear to main reinforcing all sides.
Walls	
- Earth and weather faces	2" clear
- Other faces	1" clear
Beams	2" clear to main reinforcing, top, sides, and bottom.

RELATED MATERIALS:

Control Joints: 20 ga. min. galvanized steel or plastic, widths as required.

See Section 025200 CONCRETE WALKS, CURBS, AND PAVING for other joint requirements.

Expansion joint material shall be asphalt impregnated fiber type.

Moisture Barrier: Provide moisture barrier cover over prepared base material where indicated. Use only materials which are resistant to decay when tested in accordance with ANSI/ASTM E 1745 and E 154, as follows:

Fortfiber Corp. "15 mil Moistop Ultra A"; W. R. Meadows "Perminator, 15 mil Underslab Vapor-Mat", Griffolyn, "15 mil Green" by Reef Industries; Raven Industries "Vapor Block 15", Stego Industries "Stego Wrap 15 mil".

All joints in vapor barrier shall be sealed with manufacturer's recommended tape for entire length of lap joint. All penetrations shall be sealed as recommended by the Manufacturer.

Moisture-Retaining Cover: One of the following, complying with ASTM C171:

Waterproof paper.
Polyethylene film.
Polyethylene-coated burlap.

Chemical Hardener: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate with a wetting agent, containing not less than 2 lbs. fluosilicate per gal. Subject to requirements provide one of the following:

"Surfhard"; Euclid Chemical Co.
"Lapidolith"; Sonneborn-Contech.
"Saniseal"; Master Builders.
"Burk-O-Lith"; The Burke Co.
"Sealtight Pena-Lith; W. R. Meadows.

Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material.

Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

Furnish ties that, when removed, will leave holes not larger than 1 inch (25 mm) in diameter in concrete surface.

Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

Flexible Rubber Waterstops: CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes. Use any of the following:

Profile: Flat, dumbbell with center bulb.
Profile: Flat, dumbbell without center bulb.
Profile: Ribbed with center bulb.
Profile: Ribbed without center bulb. Reinforcing Supports: Provide pre-fabricated wire supports with plastic coating on support rails for all wire and bar reinforcing in slabs and toppings. Concrete brick may be used at depressions only.

PART 3 - EXECUTION

FORMWORK:

Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

Construct forms tight enough to prevent loss of concrete mortar.

Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.

Do not use rust-stained, damaged and disturbed steel form-facing material, or form material with cementitious accumulations.

Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

Re-tighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

EMBEDDED ITEMS:

Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

Install anchor bolts, imbeds and reinforcing, accurately located, to elevations required.

Flexible Waterstops: Install in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's written instructions.

Portland cement shall conform to ASTM C150-07, Type I.

Aggregates for standard weight concrete shall conform to ASTM C33-03, maximum size: #57.

Mixing water shall be potable.

Ready-mixed concrete shall conform to ASTM C94-09. Not more than one hour shall elapse between the time mixing water is added to the batch and the concrete is placed in the forms. No water shall be added on the job.

All embedded items, including reinforcing, anchor bolts and dowels, shall be in place, preset, held in position before any concrete is placed. Forty-eight hours notice shall be given the Architect, of an impending pour, so that he may observe the work prior to the placing of concrete.

Concrete shall be conveyed from the mixer to the place of final deposit by methods that will prevent separation or loss of material.

Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to re-handling or flowing. The placing shall be carried on at such a rate that the concrete is at all times plastic and flows readily into the spaces between bars. When placing is started, it shall be carried on as a continuous operation, until placement of the section is completed.

Concrete shall be worked into forms, around bars and embedded items with spades, rods, trowels and vibrators, so as to produce a solid homogeneous mass, free of pockets voids and honeycombs.

Concrete shall be cured by maintaining it in a moist condition for 7 days after placing. No curing compound shall be used.

Construction joints shall be so made and located so as to least impair the strength of the structure. Where a joint is made, the surface of the concrete shall be cleaned and all laitance removed. In addition, vertical joints shall be left rough or mechanically roughened, wetted slushed with a coat of neat cement grout immediately before placing new concrete. In addition, provide horizontal keys in beams and wall footings equal to 1/3 the depth of the member.

FINISHES - FORMED CONCRETE:

Exposed concrete shall receive a smooth rubbed finish, (including exposed concrete on interior of building), rubbing the surface with carborundum stone and water, after patching tie holes, depressions, honeycombs, air pockets, voids and blemishes, to a true even smooth finish of uniform color and texture. No slush coat of cement, cement grout or cement wash will be permitted at any stage of the finishing.

Concrete surfaces to receive paint or surface coating shall be considered exposed surfaces. Coordinate requirements of surfaces which receive paint or surface coating with Specifications Division 9, FINISHES.

Unexposed concrete shall have burrs removed, honeycombs patched, tie holes filled and be left otherwise unfinished.

FINISHES - SLABS:

All slabs, regardless of finish, shall be finished to within 1/8" in 10'-0" of the lines, grades or slopes shown on the Contract Drawings.

Interior floor slabs shall be trowel finished to a smooth surface, except as follows:

Floors to receive mortar bed for quarry tile or ceramic tile shall be depressed and receive a coarse broom finish.

CONTRACTOR:

Contractor coordinate structural and architectural drawings for floor finish recesses prior to pouring any concrete.

Contractor: Verify where depressions are required prior to pouring any concrete slabs.

Sub-floor for thin set ceramic tile floors: Where floors are indicated to have thin set ceramic tile, omit steel troweling and provide a fine broom finish.

All interior slabs not covered by an applied finish material shall receive a chemical hardener finish.

Chemical-Hardener Finish:

FLOORS SHALL BE CLEANED BEFORE ANY APPLICATION.

Apply chemical-hardener finish to interior concrete floors where indicated. All interior concrete floors not scheduled to receive another applied floor finish shall receive hardener. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water (parts of hardener/water as follows), and apply in 3 coats; first coat, 1/3-strength; second coat, 1/2-strength; third coat; 2/3-strength. Evenly apply each coat, and allow 24 hours for drying between coats.

Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.

After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

MOISTURE BARRIER:

Moisture Barriers shall be installed under all slabs on grade within enclosed spaces.

Moisture Barriers under slabs shall be installed directly over subfill. Laps shall be six (6") inches side and end and shall be sealed with a continuous coating of cement or tape as recommended by the manufacturer.

Provide another layer of moisture barrier over punctures or tears, lapping edges of ruptured barrier at least twelve (12") inches. Where manufacturer's requirements exceed this, provide repairs per manufacturer's instructions.

Edge Treatment: Turn up barrier at edges of all interior slabs at walls or vertical surfaces.

All soil, water pipes, or other vertical projections through slabs shall be grouted around with mastic and/or manufacturer's recommended closure.

EXPANSION JOINTS:

Expansion joints shall be installed where exterior concrete slabs abut vertical surfaces.

MISCELLANEOUS CONCRETE ITEMS:

Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

CONCRETE CURING AND PROTECTION:

General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for a least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing, as herein specified. Curing compounds will not be permitted.

Provide moisture curing by following methods:

Keep concrete surface continuously wet by covering with water.

Continuous water-fog spray.

Covering concrete surface with absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

Provide moisture-cover curing as follows:

Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

CONCRETE SURFACE REPAIRS:

Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

STRUCTURAL STEEL:

All structural steel extending below floor slabs or extending below grade on exterior shall have not less than 3" of concrete protection on all sides from footing to finished floor or finished grade.

PROTECTION:

Protect concrete from damage until acceptance of work. Sweep concrete and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

End of Section 033100

SECTION 042000 - UNIT MASONRYPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of each type of masonry work is indicated on drawings and schedule.

Wall Insulation is specified in a Division 7 Section.

QUALITY ASSURANCE:

Field Constructed Mock-Ups: Prior to installation of masonry work, erect sample wall representative of completed masonry work required for project with respect to qualities of appearance, materials and construction. Masonry mock up shall incorporate an aluminum storefront window frame, glazing, field brick, accent brick, soldier courses, CMU, CMU backup, selected mortar(s), selected caulking, building insulation, masonry accessories, efis, roof coping/gravel stops. Locate mock-ups on site as directed by Architect. Retain mock-ups during construction as standard for judging completed masonry work. Build mock-up which is approximately 8' long by 8' high by full thickness including back-up wythes, if any. Provide mock-up with one exterior 90 deg. corner and one vertical joint to be used for exterior caulk samples. Provide adequate bracing of panel until it is removed from site. When directed, demolish mock-ups and remove from site.

Owner shall employ a material testing agency to monitor thru wall flashing installation, and all grout and/or mortar placement.

WARRANTY:

Contractor shall provide 2-year material and labor warranty against failures in through-wall materials and workmanship.

SUBMITTALS:

Samples: Submit, for verification purposes, samples of each exposed masonry unit and colored masonry mortar. Include in each set of samples the full range of exposed colors and textures to be expected in completed work.

Colored masonry mortar samples for each color required showing the full range of color which can be expected in the finished work. Label samples to indicate type and amount of colorant used.

JOB CONDITIONS:

Protection of Work: During erection, cover top of walls with heavy waterproof sheeting at end of each days' work. Cover partially completed structures when work is not in progress.

Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.

Do not apply uniform concentrated loads for at least 3 days after building masonry walls or columns.

Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry. Protect base of walls from rain-splashed mud and mortar splatter by means of covering spread on ground and over wall surface.

Protect sills, ledges and projections from droppings of mortar.

Cold Weather Protection:

Protect masonry against freezing when the temperature of the surrounding air is 40 deg. F. and falling. Comply with the requirements of the governing code and with the "Construction and Protection recommendations for Cold Weather Masonry Construction" of the Technical Notes on Brick and Tile Construction by the Brick Institute of America (BIA).

Do not lay masonry units which are wet or frozen.

Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.

Remove all masonry determined to be damaged by freezing conditions.

PART 2 - PRODUCTSMASONRY UNITS, GENERAL:

Manufacturer: Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.

BRICK:

For sills, caps and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncured or unfroged units with all exposed surfaces finished.

Face Brick shall be purchased under an allowance of Four Hundred Fifty Dollars per thousand (\$450/M) including delivery to the site and sales tax. O.H.& P., handling loading and unloading, with installation shall be included in the Base Bid. Brick shall match existing building field and accent.

Contractor shall include line item in schedule of values for brick quantity and allowance. Where bricks are purchased for less than the allowance, the unused brick allowance shall be credited to Owner when masonry is complete.

Face brick shall match existing **Norman modular** size and color as close as possible.

Face Brick Standard: ASTM C 216, and as follows:

Grade SW

Type FBS (for general use in exposed masonry requiring minimum variations in size and color ranges).

Application: Use where brick is exposed, unless otherwise indicated.

CONCRETE MASONRY UNITS (CMU):

Size: Manufacturer's standard units with nominal face dimensions unless otherwise indicated.

Special Shapes: Provide where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.

Provide sash units at all vertical expansion and control joints.

All outside corners shall be bullnose block.

Hollow Load Bearing (HL) CMU: ASTM C 90.

Grade N.

Weight Classification: Lightweight units unless otherwise indicated. (Less than 105 lbs. per cu. ft., oven dry weight of concrete).

Exposed Faces: Provide manufacturer's standard color and texture, unless otherwise indicated.

Provide UL fire rated units where called for on the drawings for fire rating shown. Furnish UL Certificate for rated units.

MORTAR MATERIALS:

Mortar Mix shall be accordance with ASTM C270. Acceptable mortar mix is as follows: Marquette, Magnolia, Coosa, Medusa, Giant.

Mortar for cement washes: EMBECO Premixed Mortar, manufactured by Master Builders or approved equal.

Hydrated Lime ASTM C 207, Type S.

Aggregate for Mortar: ASTM C 144, except for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.

Colored Mortar Mix: High purity, chemically inert, unfading, alkali-fast mineral oxides, finely ground and specially prepared for use in cement and lime mortars or commercially-prepared, factory-mixed mortar of color range equal to Lehigh 48B. Submit samples for final color selection by Architect. Colored mortar shall be used in exposed brick walls.

Grout in Masonry Walls: Grout for use in concrete masonry walls shall be fine or coarse grout (containing pea gravel) in accordance with ASTM C476-71. Grout shall have a minimum ultimate compressive strength of 2500 psi at 28 days and slump of 8 to 10 inches. Grout shall be mixed in a mechanical mixer.

WATER REPELLANT ADMIXTURE: Liquid water-repellant mortar admixture shall be used with all brick mortar.

The following products are acceptable:

ACT Chemistries: RainBloc for Mortar

BASF Aktiengesellschaft: Rheopel Mortar Admixture

Grace Construction Products, W.R. Grace & Co: Dry-Bloc Mortar Admixture

SIKA Corporation: Sikamix W-10M

Water: Clean and potable.

MASONRY ACCESSORIES:Horizontal Joint Reinforcing and Ties for Masonry:

Provide welded wire units prefabricated in straight lengths of not less than 10', with matching corner ("L") and intersecting ("T") units. Fabricate from cold-drawn steel wire complying with ASTM A 82, with deformed continuous side rods and plain cross-rods, into units with widths of approximately 2" less than nominal width of walls and partitions as required to position side rods for full embedment in mortar coverage of not less than 5/8" of joint faces exposed to exterior and not less than 1/2" elsewhere. Provide the following type of joint reinforcing unless otherwise indicated.

Truss type with diagonal cross rods spaced not more than 16" o.c.

Number of Side Rods: Single pair for single wythe masonry and as indicated for multi-wythe masonry, or if not otherwise indicated, one side rod for each brick wythe and one side rod for each shell of each concrete masonry wythe.

For multi-wythe walls provide tab type consisting of single pair of side rods and rectangular box-type cross ties spaced not more than 16" o.c. Space side rods for embedment within each face shell of back-up wythe and extend ties to within 1" of exterior face of facing wythe.

Provide units with adjustable 2-piece rectangular ties where horizontal joints of facing wythe do not align with those of back-up wythe.

Wire Sizes: Fabricate with 9-gage side and cross rods, unless otherwise indicated.

Wire Finish: Provide manufacturer's standard mill galvanized finish except as otherwise indicated.

For exterior walls hot-dip galvanize joint reinforcing after fabrication to comply with ASTM A 153, Class B-2 coating (1.5 oz. per sq. ft.).

Anchors and Ties:

Provide straps, bars, bolts and rods fabricated from not less than 16 ga. sheet metal or 3/8" diameter rod stock, unless otherwise indicated.

Flexible Anchors: Where masonry is indicated to be anchored to structural framework with flexible anchors, provide 2-piece anchors which will permit horizontal and vertical movement of masonry but will provide lateral restraint.

Chase Wall Ties: Ties shall be 1/4" diameter galvanized rods formed in "Z" shape or 1/4" thick x 2" wide galvanized straps, formed to "Z" shapes with 1" leg up and down.

Flashings for Masonry:

Provide concealed flashing, shown to be built into masonry.

Provide concealed flashings and thru wall flashing as follows for Slab-on Grade/Foundation Conditions:

Minimum 5 oz. copper sheet, bonded on both sides to heavy waterproofed, creped Kraft paper, reinforced with glass fibers. Maximum available lengths to minimize end laps. Widths to achieve installation conditions.

Acceptable sheet products are: (vinyl materials not acceptable)

Cop-R-Kraft Duplex, Advanced Building Products, Inc.
Copper Kraft Duplex, Sandell Manufacturing Co., Inc.
Cop-R-Tex Duplex, York Manufacturing, Inc.

Provide for All Elevated Thru-wall Flashings (door and window heads, window sills, shelf angles and above the roof line flashing) Conditions:

TotalFlash Cavity-wall Drainage System; Mortar Net
(18", 45 40 mil ~~Thermoplastic Vinyl~~ EPDM, With PVC termination bar and kynar
finished galvanized steel drip edge, color as selected by Architect)

Mortar Break: Nylon mesh. Use one of the following:

Advanced Building Products Inc.; Mortar Break.
Archovations, Inc.; CavClear Masonry Mat.
Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarStop.
Mortar Net USA, Ltd.; Mortar Net.
Sandell Construction Solutions

Adhesive: Totally asbestos free as recommended by flashing manufacturer.

Miscellaneous Masonry Accessories:

Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60 for bars No.3 to No. 18.

Non-Metallic Expansion Joint Strips (NMEExpJt): Provide pre-molded, compressible, elastic fillers of foam rubber, neoprene, or extruded plastic.

Bond Breaker Strips: 15-lb. asphalt roofing felt complying with ASTM D 226, or 15-lb, coal-tar roofing felt complying with ASTM D 227.

Plastic Weepholes: Unless otherwise indicated, provide ¼" round x 4" long medium density polyethylene plastic tubes to form weepholes.

MORTAR AND GROUT MIXES:

Do not lower the freezing point of mortar by use of admixtures or anti-freeze agents.

Do not use calcium chloride in mortar or grout.

Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated.

Use Type S mortar for all masonry.

PART 3 - EXECUTION

INSTALLATION, GENERAL:

All external CMU corners shall be bullnosed.

Thickness: Build masonry construction to the full thickness shown, except, build single-wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness shown or specified.

Build chases and recesses as shown and as required for the work of other trades. Provide not less than 8" of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses.

Cut masonry units with motor-driven saw designed to cut masonry with clean sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible. Use dry cutting saws to cut concrete masonry units.

Wet clay brick which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which ensure that units are nearly saturated but surface dry when laid.

Do not wet concrete masonry units.

Pattern Bond: Lay exposed Brick in running bond : exposed concrete masonry units in running bond. Lay concealed masonry with all units in a wythe bonded by lapping not less than 2". Bond and unlock each course of each wythe at corners, unless otherwise shown.

Layout walls in advance for accurate spacing of surface bond patterns, with uniform joint widths and to properly locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half size units at corners, jambs and wherever possible at other locations.

Where exterior wall columns interrupt outer shell of CMU, Contractor shall secure and seal 5 oz. copper flashing full height of CMU void.

Lay-up walls plumb and with courses level, accurately spaced and coordinated with other work.

Stopping and Resuming Work:

Rack back ½-masonry unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if specified to be wetted), and remove loose masonry units and mortar prior to laying fresh masonry.

Built-In Work:

As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.

All items located in block work shall be set to work with block coursing.

Fill space between hollow metal frames and masonry solidly with mortar.

The blocks adjacent to all jambs shall have a minimum of (2) cells filled with grout.

Where pairs of doors occur with less than two full block (32") between a perpendicular wall, fill all block cells and install min. #4 rod each cell from floor to top of wall. Dowel from floor, min. dowel length 24".

Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

Fill CMU cores with grout 3 courses (24") under bearing plates, beams, lintels, posts and similar conditions unless otherwise indicated.

Intersecting Loadbearing Walls: If carried up separately, block vertical joint with 8" maximum offsets and provide rigid steel anchors spaced not more than 4'-0" o.c. vertically, or omit blocking and provide rigid steel anchors at not more than 2'-0" o.c. vertically. Form anchors of galvanized steel not less than 1-½" x ¼" x 2'-0" long with ends turned up not less than 2" or with cross-pins. If used with hollow masonry units, embed ends in mortar filled cores.

Non-Loadbearing Interior Partition Walls: Build full height of story to underside of solid structure above, unless otherwise indicated.

MORTAR BEDDING AND JOINTING:

Lay brick and solid concrete masonry units with complete filled bed, head and collar joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.

Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with concrete or grout. For starting courses on footings where cells are not grouted, spread out full mortar bed including areas under cells.

Joints: Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not otherwise indicated, lay walls with ⅜" joints. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials. Rake out mortar in preparation for application of caulking or sealants where shown.

Exposed Brick: Tool exposed joints for a tooled concave joint.

Exposed Concrete Masonry Units: Tool exposed joints to produce a "tooled concave joint", vertical and horizontal. Flush cut unexposed joints.

Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove unit, clean off mortar and reset in fresh mortar.

Provide weep holes in exterior wythe of composite and veneer walls located immediately above ledges and flashing, spaced 2'-0" o.c., unless otherwise indicated.

STRUCTURAL BONDING OF MULTI-WYTHE MASONRY:

Use continuous horizontal joint reinforcing embedded in horizontal joints for bond tie between wythes. Install at not more than 16" o.c. vertically as specified. Provide continuity at corners and intersections using prefabricated "L" and "T" units.

Bond chase walls with rods or straps at 16" vertically and 24" horizontally.

HORIZONTAL JOINT REINFORCING:

Provide continuous horizontal joint reinforcing as shown and specified. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of $\frac{5}{8}$ " on exterior side of walls and $\frac{1}{2}$ " at other locations. Lap reinforcement a minimum of 6". Do not bridge control and expansion joints with reinforcing, unless otherwise indicated. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

Space continuous horizontal reinforcing as follows:

For multi-wythe walls (solid or cavity) where continuous horizontal reinforcing acts as structural bond or tie between wythe, space reinforcing as required by code but not less than 16" o.c. vertically.

For single-wythe walls, space reinforcing at 16" o.c. vertically, unless otherwise indicated.

At foundation walls, finish floor to top of footing, install horizontal reinforcing at 8" on center vertically.

LINTELS:

Install loose lintels of steel and other materials where shown.

Provide masonry lintels where shown and wherever openings of more than 1'-0" are shown without structural steel or other supporting lintels. Provide precast or formed-in-place masonry lintels. Thoroughly cure precast lintels before handling and installation. Temporarily support formed-in-place lintels.

For hollow concrete masonry unit walls, use specially formed "U"-shaped lintel units with reinforcing bars placed as shown and filled with concrete grout of consistency required to completely fill space between reinforcing bars and masonry unit.

Provide minimum bearing of 8" at each jamb, unless otherwise indicated.

CONTROL AND EXPANSION JOINTS:

Provide vertical expansion, control and isolation joints in masonry where shown. Build-in related masonry accessory items as the masonry work progresses.

See Division 7 sections for "Joint Sealers."

FLASHING OF MASONRY WORK:

Provide concealed flashings in masonry work at, or above, all shelf angles, lintels, ledges and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior. Prepare masonry surfaces smooth and free from projections which could puncture flashing. Place through-wall flashing on bed of mortar and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar.

Wall flashings shall be continuous, lapped and sealed. Outside corners shall be lapped and sealed also. Step and overlap flashings as necessary to accommodate roof slopes.

Extend flashings the full length of lintels and shelf angles and minimum of 4" into masonry each end. Extend flashing from ¼" outside exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4", or as shown on drawings, and through the inner wythe to within ½" of the interior face of the wall in exposed work. Where flashing are at grade, stop flashing ¼" from exterior face of exterior wythe of masonry. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2". At heads and sills turn up ends not less than 2" to form a pan, see drawing details.

Where masonry is discontinuous at exterior wall exterior surface due to columns (in place or at corners), Contractor shall install specified copper flashing to cover gap in masonry from lowest level flashing to roof eave in shingle fashion. Flashing shall overlap lowest horizontal flashing and extend behind roof eave ice and water shield. Flashing shall extend minimum 6" beyond masonry gap horizontally. Secure vertical edges of flashing with stainless steel termination bars. PVC termination bars provided by Total Flash supplier are acceptable.

Provide weepholes in the head joints of the same course of masonry bedded in the flashing mortar.

Install flashings in accordance with manufacturer's instructions. Install mortar break in wall cavity above all flashings.

Install reglets and nailers for flashing and other related work where shown to be built into masonry work.

Total Flash Cavity-Wall Drainage System shall be used for all door and window heads, window sills, shelf angles and masonry flashing above roofing. Install as recommended by manufacturer. System shall incorporate kynar coated galvanized steel edge, Contractor shall contact manufacturer for on site installation instructions. Coordinate with Architect.

REPAIR, POINTING AND CLEANING:

Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.

Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of caulking or sealant compounds.

Clean exposed brick masonry surfaces by the bucket and brush hand cleaning method or by high pressure water method. Comply with requirements of BIA Technical Notes No. 20 "Cleaning Brick Masonry".

Use commercial cleaning agents in accordance with manufacturer's instructions. Protect all in-place work from damage due to masonry cleaning.

Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings. Comply with recommendations in NCMA TEK Bulletin No. 28.

Secure minimum 24" wide vertical plastic and cover grade width 3" thick, 3' wide mulch strip at base of building to protect brick masonry from mud and other construction splatters. Protection shall remain until hardscape and/or landscape are established. Remove plastic and point masonry, and remove mulch where necessary, dispose of as waste material as defined under Site Work.

Protect exterior masonry from staining due to unfinished grades at and near the building.

End of Section 042000

SECTION 051200 - STRUCTURAL STEELPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of structural steel work is shown on drawings.

Miscellaneous Metal Fabrications are specified elsewhere in Division 5.

QUALITY ASSURANCE:

Codes and Standards: Comply with provisions of following, except as otherwise indicated:

AISC "Code of Standard Practice for Steel Buildings".

AISC "Specifications for Structural Steel Buildings", including the "Commentary" and Supplements thereto as issued.

AISC "Specifications for Architecturally Exposed Structural Steel".

AISC "Specifications for Structural Joints using ASTM A 307 or A 325 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

AWS D1.1 "Structural Welding Code".

ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".

Qualifications for Welding Work:

The Contractor shall submit to the Architect an affidavit stating that all welders employed by him or by his subcontractors in the execution of work under this contract, have been qualified by tests as prescribed in the American Welding Society's Standard Qualification Procedure (AWS D1.1-98).

Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

If re-certification of welders is required, retesting will be Contractor's responsibility.

TESTING:

Testing of field welds and bolted connections shall be performed by an independent laboratory selected by and paid by the Owner.

Note: Retest due to improper or unsatisfactory results shall be at the contractor's expense. Refer to the General Conditions. In the event that tests reveal conditions that do not meet the requirements of the Specifications, all costs for the removal, replacement or remediation and re-testing thereof shall be borne by the contractor.

SUBMITTALS:

Shop Drawings: Submit shop drawings including complete details and schedules for fabrication and assembly of structural steel members procedures and diagrams. Coordinate work with precast concrete subcontractor to ensure interface of both trades.

Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld.

Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed by others.

Reproductions of the Contract Drawings shall not be used for shop drawings. General Contractor shall check shop drawings for conformance to Contract Documents and shall affix his stamp and initials to each sheet that he has complied.

FIELD DIMENSIONS:

The Contractor shall take all dimensions in the field as required to verify or supplement dimensions shown on the Contract Drawings, and he will assume all responsibility for fitting his work to work in place.

Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Architect.

DELIVERY, STORAGE AND HANDLING:

Deliver materials to site at such intervals to insure uninterrupted progress of work.

Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay work.

Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

MATERIALS:

Metal Surfaces General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes.

Structural steel angles plates and bars: ASTM A 36.

Structural steel I-shapes: ASTM A 992.

Hot-Formed Steel Tubing: ASTM A 501.

Cold-Formed Steel Tubing: ASTM A 500, Grade B.

Bolts: ASTM A 325.

Anchor Bolts: ASTM F1554, non-headed type unless otherwise indicated.

All material shall be clean and straight. If straightening and flattening are necessary, they shall be done by a process and in a manner that will not injure the material. Sharp kinks or bends will be a cause for rejection.

Finished members shall be trued to line and free from twists, bends or open joints.

Compression joints depending upon contact bearing shall have the bearing surfaces truly machined to a common plane or saw cut. All other joints shall be cut straight.

All members shall be one piece for their full length; splicing is not permitted.

Before leaving the shop, all structural steel and iron work shall, by use of wire brushes and scrapers, be cleaned of all dirt, loose mill scale and rust.

Bolt holes shall be punched or drilled. "Blowing" holes, not permitted.

PAINTING:

All structural steel (except where to be embedded in concrete, field welded or covered with sprayed-on fireproofing) shall receive one shop coat of rust inhibitive primer, equal to Steel Structures Painting Council Specification 15-68T, Type I (Red Oxide).

Subsequent to erection, all areas where paint has been injured or destroyed or left unpainted for welding, shall be painted with one coat of paint as specified above.

The basic requirement of this specification is that all material (not embedded in concrete) shall have one unbroken coat of paint.

Non-metallic Shrinkage-Resistant Grout: Pre-mixed, non-metallic, non-corrosive, non-staining product containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with CRD-C621.

FABRICATION:

Shop Fabrication and Assembly: Fabricate and assembly structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.

Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.

PART 3 - EXECUTIONERECTION:

All material shall be erected plumb and true to lines and grades shown on the Contract Drawings.

Connections shall be as shown on the Contract Drawings.

Welding shall be done in accordance with AWS D1.1-04.

Subsequent to the erection of columns, beams and bracing and plumbing and squaring building, but prior to the installation of floor and roof deck, column base plates shall be grouted.

No abutting materials shall be installed until structural frame has been plumbed, bracing tensioned and base plates grouted.

Provide temporary bracing to achieve proper alignment of structure as erection proceeds.

Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.

Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.

Refer to Division 3 of these specifications for anchor bolt installation requirements in concrete, and Division 4 for masonry installation.

Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

Set loose and attached base plates and bearing plates for structural members on steel wedges or other adjusting devices.

Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.

Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.

For proprietary grout materials, comply with manufacturer's instructions.

Field Assembly:

Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

Level and plumb individual members of structure to lines and grades shown on Contract Drawings.

Establish required leveling and plumbing measurements on mean operating temperature of structure.

All members shall be one piece for full length, no shop splicing will be allowed.

Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

Do not enlarge unfair holes in members by burning or by use of drift pins. Ream holes that must be enlarged to admit bolts.

Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors.

Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

Following erection, clean all fabrication marking, labeling/identification marks, from exposed steel.

End of Section 051200

SECTION 052100 - STEEL JOISTS AND GIRDERSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division -1 Specification Sections, apply to work of this Section.

SUMMARY:

This Section includes the following:

- K-series open-web steel joists.
- LH-series longspan steel joists.
- DLH-series deep-longspan steel joists.
- Joist girders.
- Joist accessories.

QUALITY ASSURANCE:

SJI Design Standard: Comply with recommendations of SJI's "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders," applicable to types of joists indicated.

Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel" and AWS D1.3 "Structural Welding Code--Sheet Steel."

Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

SHOP DRAWINGS:

Shop drawings are required for all steel joists and Girders. All dimensions, complete welding information, and all details and notes appearing on the Drawings and giving information for the erection of steel joists shall be shown on the Shop Drawings. Submit sepia.

Reproductions of the Contract Drawings shall not be used for shop drawings. General Contractor shall check shop drawings for conformance to Contract Documents and shall affix his stamp and initials to each sheet that he has complied. Border details shall not be used.

MATERIALS:

All steel joists shall be manufactured by a member company of the Steel Joist Institute.

Supply ceiling extensions, either extended bottom chord elements or a separate extension unit of sufficient strength to support ceiling construction. Extend ends to within ½ inch (13 mm) of finished wall surface, unless otherwise indicated.

Supply miscellaneous accessories, including splice plates and bolts required by the joist manufacturer to complete the joist installation.

PAINTING:

Do not shop paint joists to receive fireproofing.

All other steel joists shall receive one coat of rust inhibitive primer, equal to Steel Structures Painting Council Specification 15-68T, Type I (Red Oxide).

Subsequent to erection, all areas where paint has been injured or destroyed or left unpainted for welding shall be painted with primer as specified above.

The basic requirement of this specification is that all material (not embedded in concrete) shall have one unbroken coat of paint.

ERECTION:

All material shall be erected plumb and true.

Connections shall be as shown on the Contract Drawings.

Welding shall be in accordance with AWS D1.1-04.

Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.

Following erection clean all fabrication marking, labeling/identification marks, from exposed steel.

FIELD DIMENSIONS:

The Contractor shall take all measurements in the field as necessary to verify or supplement dimensions shown on the Contract Drawings, and he shall assume all responsibility for fitting his work in place.

End of Section 052100

SECTION 053050 - METAL ROOF DECKPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification sections apply to work of this section.

DESCRIPTION OF WORK:

Extent of metal decking is indicated on the drawings, including basic layout and type of deck units required.

QUALITY ASSURANCE:

The following specifications and codes form a part of this specification:

AISI Specification for the Design of Light Gauge Cold-Formed Steel Structural Members.

Basic Design Specifications for Steel Roof Deck Construction of the Steel Deck Institute, latest edition.

SDI Code of Recommended Standard Practice, latest edition.

Structural Welding Code of the American Welding Society, AWS D1.1-04.

SHOP DRAWINGS:

Shop drawings are required for all Metal Decking. All dimensions, complete welding information and all details and notes appearing on the drawings and giving information for the erection of metal deck shall be shown on the shop drawings.

Reproductions of the Contract Drawings shall not be used for shop drawings. General Contractor shall check shop drawings for conformance to Contract Documents and shall affix his stamp and initials to each sheet that he has complied. Border details shall not be used.

QUALIFICATION OF WELDERS:

Submit to the Architect an affidavit stating that all welders to be used in the execution of work have been previously qualified by tests as prescribed in the American Welding Society's Standard Qualification Procedure to do the type of welding which the work involves.

PART 2 - MATERIALS

Metal roof deck shall be 1-½" - 22 gauge, galvanized, Wide Rib steel deck as defined by the Steel Deck Institute.

Furnish ridge, valley plates, edge closures, and accessories. Provide 22 gauge plates at all changes in direction of roof deck.

Do not apply "pacivators" to metal deck to be field painted or to receive spray fire proofing.

Note: Where metal deck is scheduled to be field painted, or to receive sprayed-on fire proofing , primed metal deck may be used.

Subsequent to erection, all areas where paint or galvanizing has been injured or destroyed shall be painted with one coat rust inhibitor primer.

PART 3 - EXECUTION

ERECTION:

Decking shall be installed to meet the criteria as specified under INSPECTION OF METAL DECK below.

Metal roof deck units shall be continuous over a minimum of three spans.

Deck shall be secured to each support by welding through welding washers. Weld pattern as shown on structural drawings. Where deck change of direction occurs, each abutting edge shall be considered a perimeter and shall be attached to the structure at 6"o.c.

Welding shall be done in accordance with the Structural Welding Code, AWS D1.1-04.

Connect ridge and valley plates and edge closures with #8 SMS @ 6" o. c. Holes and openings shall be cut by the steel deck erector.

INSPECTION OF METAL DECK:

Examine metal deck surfaces in accordance with the following requirements. Correct all metal deck not complying.

Verify that flatness and fastening of metal roof decks comply with the following:

Top Flanges: No concavity or convexity in excess of 1/16" across any 3 adjacent flanges.

Side Laps: Properly nested and mechanically fastened at max. spacing of 24" o.c.

End Laps: Minimum 2" laps located over and fastened to supports.

Deck secured to each supporting member in every other rib (max. spacing 12" o.c.) with $\frac{5}{8}$ " diameter welds. Perimeter deck edges shall be secured at 6" o.c. maximum with $\frac{5}{8}$ " diameter welds.

CLOSURE STRIPS:

Furnish closed cell rubber or neoprene closure strips at roof deck and walls where deck ribs are perpendicular to exterior or interior walls enclosing return air areas, fire rated partitions, and at all exterior or interior walls where deck ribs are perpendicular to walls carried to bottom of roof deck. Closure strips shall be one (1) inch wide and shaped to fit roof

Touch-Up Painting: After decking installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.

Touch-up painted surfaces with repair paint applied in accordance with manufacturer's instructions.

Touch-up painted surfaces with same type of shop paint used on adjacent surfaces.

In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.

End of Section 053050

SECTION 053100 - COMPOSITE STEEL FLOOR DECKPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification sections apply to work of this section.

DESCRIPTION OF WORK:

Extent of metal decking is indicated on the drawings, including basic layout and type of deck units required.

SHOP DRAWINGS:

Submit reproducible shop drawing of all shop drawing submittals, accompanied by one (1) blue line print.

Shop drawings are required for all Steel Decking. All dimensions, complete welding information and all details and notes appearing on the drawings and giving information for the erection of metal deck shall be shown on the shop drawings.

Reproductions of the Contract Drawings shall not be used for shop drawings. General Contractor shall check shop drawings for conformance to Contract Documents and shall affix his stamp and initials to each sheet that he has compiled. Border details shall not be used.

QUALIFICATION OF WELDERS:

Submit to the Architect an affidavit stating that all welders to be used in the execution of work have been previously qualified by tests as prescribed in the American Welding Society's Standard Qualification Procedure to do the type of welding which the work involves.

PART 2 - MATERIALS

Composite Steel Floor Deck: Fabricate panels with integrally embossed or raised pattern ribs and interlocking side laps, conforming to SDI Publication No. 28 "Specifications and Commentary for Composite Steel Floor Deck," the minimum section properties indicated, and the following:

Shall be galvanized, min yield strength of 50,000 psi.

PART 3 - EXECUTIONERECTION:

Steel deck shall be attached as follows:

at supports: $\frac{3}{4}$ " diameter puddle welds. Where puddle welds are not satisfactory, welds shall be thru 16 gage welding washers.

Spacing of connections shall be as follows unless noted otherwise on the drawings:

End laps: At each valley.

Side laps: at mid-span or 3'-0", whichever is smaller. Hex head screws size #10 can be used at side lap connections.

Intermediate supports: at each valley.

Welding shall be done in accordance with the Structural Welding Code, AWS D1.1-98.

Touch-Up Painting: After decking installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.

Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.

End of Section 053100

SECTION 054000 - COLD-FORMED METAL FRAMINGPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

SUMMARY:

Types of cold-formed metal framing units include the following:

Load-bearing punched channel studs.

C-shaped load-bearing steel studs.

SUBMITTALS:

General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

Shop Drawings: Submit complete fabrication and erection drawings for review by the Structural Engineer of record prior to the commencement of fabrication. Drawings to be signed and stamped by a licensed structural engineer in the state in which construction will occur. Include placing drawings for framing members showing size and gage designation, number, type, location, spacing, and connections. Indicated supplemental trapping, braces, splices, bridging, accessories and details required for proper installation.

Product data and installation instructions for each item of cold-formed metal framing and accessories.

QUALITY ASSURANCE:

Welding: Use qualified welders and comply with American Welding Society (AWS) D1.3, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTSMANUFACTURERS:

Manufacturers: Subject to compliance with requirements, provide products of one of the following:

Alabama Metal Industries Corp.
Dale Industries, Inc.

Superior Steel Studs, Inc.
USG Industries

Dietrich Industries, Inc.
Marino Industries, Inc.

United States Steel
Wheeling Corrugating Co.

METAL FRAMING:

System Components: Manufacturers' standard load-bearing steel studs and joists of type, size, shape, and gauge as indicated. With each type of metal framing required, provide manufacturer's standard, steel runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners, and accessories for applications indicated, as needed to provide a complete metal framing system.

Materials and Finishes:

For 16-gauge and heavier units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 40,000 psi; ASTM A 446, A 570, or A 611.

For 18-gauge and lighter units, fabricate metal framing components of commercial quality steel sheet with a minimum yield point of 33,000 psi; ASTM A 446, A 570, or A 611.

All studs shall be 18 AND 20 gauge as noted and welded.

Provide galvanized finish to metal framing components complying with ASTM A 525 for minimum G 60 coating.

Fasteners: Provide nuts, bolts, washers, screws, and other fasteners with corrosion-resistant plated finish.

Electrodes for Welding: Comply with AWS Code and as recommended by stud manufacturer.

Galvanizing Repair: Where galvanized surfaces are damaged, prepare surfaces and repair in accordance with procedures specified in ASTM A 780.

FABRICATION:

General: Framing components may be prefabricated into assemblies before erection. Fabricate panels plumb, square, true to line, and braced against racking with joints welded. Perform lifting of prefabricated units to prevent damage or distortion.

Fabricate units in jig templates to hold members in proper alignment and position and to assure consistent component placement.

Fastenings: Attach similar components by welding. Attach dissimilar components by welding, bolting, or screw fasteners, as standard with manufacturer.

Wire tying of framing components is not permitted.

Fabrication Tolerances: Fabricate units to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet.

PART 3 - EXECUTION

INSTALLATION:

General: Install metal framing systems in accordance with manufacturer's printed or written instructions and recommendations.

Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as recommended by stud manufacturer for type of construction involved, except do not exceed 24 inches o.c. spacing for nail or power-driven fasteners or 16 inches o.c. for other types of attachment. Provide fasteners at corners and ends of tracks.

Installation of Wall Studs: Secure studs to top and bottom runner tracks by either welding or screw fastening at both inside and outside flanges.

Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.

Where stud system abuts structural columns or walls, including masonry walls, anchor ends of stiffeners to supporting structure.

Install supplementary framing, blocking, and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported.

Frame wall openings larger than 2 feet square with double stud at each jamb of frame except where more than two are either shown or indicated in manufacturer's instructions. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated.

Frame both sides of expansion and control joints with separate studs; do not bridge the joint with components of stud system.

Install horizontal stiffeners in stud system, spaced (vertical distance) at not more than 54 inches o.c. Weld at each intersection.

Erection Tolerances: Bolt or weld wall panels (at both horizontal and vertical junctures) to produce flush, even, true-to-line joints.

Maximum variation in plane and true position between prefabricated assemblies should not exceed 1/16 inch.

Field Painting: Touch-up damaged shop-applied protective coatings. Use compatible primer for prime-coated surfaces; use galvanizing repair system for galvanized surfaces.

End of Section 054000

SECTION 055000 - METAL FABRICATIONSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Definition: Metal fabrications includes items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.

QUALITY ASSURANCE:

Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

Codes and Standards: AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings"; AWS "Structural Welding Code", comply with applicable provisions unless otherwise indicated.

SUBMITTALS:

Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.

Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.

PART 2 - PRODUCTS:MATERIALS:Ferrous Metals:

Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.

Steel Plates, Shapes and Bars: ASTM A 36.

Steel Bar Grating: ASTM A 569 or ASTM A 36.

Steel Tubing: Cold-formed, ASTM A 500; or hot-rolled, ASTM A 501.

Structural Steel Sheet: Hot-rolled, ASTM A 570; or cold-rolled ASTM A 611, Class 1; of grade required for design loading.

Galvanized Structural Steel Sheet: ASTM A 446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.

Steel Pipe: ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.

Gray Iron Castings: ASTM A 48, Class 30.

Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.

Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.

Grout:

Metallic Non-Shrink Grout: Pre-mixed, factory-packaged, ferrous aggregate grout complying with CE CRD-C588, Type M.

Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

Fasteners:

General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.

Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.

Lag Bolts: Square head type, FS FF-B-561.

Machine Screws: Cadmium plated steel, FS FF-S-92.

Wood Screws: Flat head carbon steel, FS FF-S-111.

Plain Washers: Round, carbon steel, FS FF-W-92.

Masonry Anchorage Devices: Expansion shields, FS FF-S-325.

Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.

Lock Washers: Helical spring type carbon steel, FS FF-W-84.

Shop Paint: FS TT-P-86, Type II or SSPC-Paint 14. Apply to cleaned and degreased steel surfaces at rate to provide a 2.0 mil dry film thickness.

Galvanizing: ASTM A386 for assembled products; A153 for iron and steel hardware.

Fabrication, General: Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Shop-paint all items not specified to be galvanized after fabrication.

Weld corners and seams continuously; grind exposed welds smooth and flush.

Form exposed connections with hairline, flush joints; use concealed fasteners where possible.

Rough Hardware: Furnish custom Fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes for framing and supporting and anchoring woodwork.

Loose Bearing Plates: Provide for steel items bearing on masonry or concrete, as shown. Drill plates to receive anchor bolts.

Loose Steel Lintels: Fabricate to sizes shown.

Miscellaneous Framing and Supports: Provide as required to complete work and not included with structural steel framework. Fabricate of welded construction in as large units as possible; drill and tap as required to receive hardware and similar items. Include required anchors for building into other work; spaced not more than 24" on center.

Miscellaneous Steel Trim: Fabricate to shapes and sizes as required for profiles shown; continuous welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings, and anchorages; coordinate assembly and installation with other work.

All exterior ferrous metals shall be hot dip galvanized.

EXPANSION JOINT COVERS:

Wall to Wall or drywall Ceiling to drywall Ceiling: MM EX-K1 (1"): EX-K2 (2")

Inside Wall Corner: MM EX-L1 (1"): EX-L2 (2"): EX-KL4

Lay-in Ceiling to Ceiling or Wall to Ceiling: Expand-O- Flexible Closure where indicated.

Floor expansion joint: Watson-Bowman-Acme Model FJC2" floor to floor extruded plate. At elevated slab, joint shall maintain fire separation requirements between floors. At walls, joint shall maintain rating of wall across joint.

Material: Aluminum 204R-1, clear anodized for interior and exterior joint covers..

Joints by MM Systems Corp.; Balco; Architectural Art Mfg. Co., Metalines, Inc., Watson-Bowman-Acme, Integrated Products Group, Inc, Jointmaster, Div. of ICS Group, Inc..

ALL EXPANSION JOINTS SHALL BE JOB SITE MEASURED BEFORE ORDERING ANY EXPANSION JOINTS.

Ladders: Furnish steel ladders at elevator pit, upper to lower roof access and roof scuttle as shown on the drawings.

ORNAMENTAL FENCE SYSTEM:

Provide fence and gate as shown on drawings.

Fence shall be Ameristar, Echelon II-Majestic component ornamental fence system (Basis of Design). Fence shall be flat top and bottom, three rail system (TB). Posts shall be 2-½" sq., .080 extruded aluminum. Pickets shall be 1" sq., .062 extruded aluminum ¾" max. clear between pickets. Rails shall be 1.75" sq., .070 extruded aluminum. Maximum post spacing shall be 8'-0" unless otherwise noted. All components shall conform to ASTM B221. All posts and rails shall be aluminum conforming to Alloy and Temper Designation 6005-T52; for pickets 6063-T52 with black polymer finish coating. All fence sections shall be bolted to posts. Where grades slope, rails shall follow sloping grades. Posts shall be set 12" deep in concrete curb and grouted with non-shrink grout. Fence height shall six (6) feet high, from top of curb to top rail. Install per manufacturer's instructions. Touch up any damage to finish with two coats of manufacturer's matching fence color following installation.

Products meeting the above requirements by Ameristar Fence Products, Alumi-Guard Aluminum Fencing, Elite Fence Products, Inc., and Merchants Metals are acceptable.

STEEL PIPE RAILINGS AND HANDRAILS:

Fabricate steel pipe railings and handrails to design, dimensions, and details indicated. Provide railings and handrails members formed of pipe of sizes and wall thickness indicated.

Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.

At tee and cross intersections provide coped joints.

At bends interconnect pipe by means of prefabricated elbow fittings or flush radius bends, as applicable, of radiuses indicated.

Form bends by use of prefabricated elbow fittings and radius bends or by bending pipe, at fabricator's option.

Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of pipe.

Provide wall returns at ends of wall-mounted handrails.

Close exposed ends of pipe by welding 3/16" thick steel plate in place or by use of prefabricated fittings.

Toe Boards: Where indicated, provide toeboards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to dimensions and details indicated, or if not indicated, use a 4" high x ½" plate welded to, and centered between, each railing post.

Brackets, Flanges, Fittings and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.

For railing posts set in concrete provide sleeves of galvanized steel pipe not less than 6" long and with an inside diameter not less than ½" greater than the outside diameter of pipe. Provide steel plate closure welded to bottom of sleeve and of width and length not less than 1" greater than outside diameter of sleeve.

Provide minimum 1" x 1" x ⅛" steel angle to trim stringer to masonry wall. Where gap is too great for 1" x 1" angle to cover provide larger angle. Weld angle to stringer and grind words. Caulk angle to wall and stringer. Sharp corners or returns are unacceptable.

Provide black steel pipe for interior and exterior railings, shop primed, except where railings are noted aluminum.

PART 3 - EXECUTION:

PREPARATION:

Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

INSTALLATION:

General:

Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plus, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete masonry or similar construction.

Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

Setting Loose Plates: Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

Set Loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.

Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

Steel Pipe Railings and Handrails:

Adjust railing prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:

Anchor posts in concrete by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.

(Option) Anchor posts in concrete by core drilling holes not less than 5" deep and 3/4" greater than outside diameter of post. Clean holes of all loose material, insert posts and fill annular space between post and concrete with non-shrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.

Leave anchorage joint exposed, wipe off excess grout and leave 1/8" build-up, sloped away from post. For installation exposed on exterior or to flow of water, seal grout to comply with grout manufacturer's directions.

Anchor posts to steel with steel oval flanges, angle type or floor type as required by conditions, welded to posts and bolted to steel supporting members.

Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts.

Anchor rail ends to steel with steel oval or round flanges welded to rail ends and bolted to structural steel members, unless otherwise indicated.

Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-½" clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required for design loading. Secure wall brackets and wall return fittings to building construction as follows:

Use type of bracket with pre-drilled hole for exposed bolt anchorage.

For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.

For hollow masonry anchorage, use Hilti HIT HY20 anchors for masonry construction with hex head.

ADJUST AND CLEAN:

Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting.

Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

For galvanized surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

Clean all fabrication marking, labeling/identification marks, from exposed steel.

End of Section 055000

SECTION 059110 - ALUMINUM DOOR CANOPIESPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Bus Canopy

Door Canopies

QUALITY ASSURANCE:

Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

Warranty: Contractor shall provide 2-year warranty against defective materials and workmanship and leaks.

SUBMITTALS:

Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in canopies.

Shop Drawings: Submit shop drawings for fabrication and erection of canopies. Include plans, elevations and details of sections and connections. Show anchorage and accessory items.

PART 2 - PRODUCTSAPPROVED MANUFACTURERS:

1. American Walkway Covers, LLC, Wetumpka, Alabama
2. Dittmer Architectural Aluminum, Winter Springs, Florida
3. E. L. Burns Company, Inc., Shreveport, Louisiana
4. Mapes Industries, Inc., Lincoln, Nebraska

5. Peachtree Protective Covers, Inc., Hiram, Georgia
6. Perfection Architectural Systems, Inc., Orlando, Florida
7. Superior Metal Products Company, Inc., Birmingham, Alabama
8. Mitchell Metals, LLC, Birmingham, Alabama

Other manufacturers may bid only after written approval from the Architect. The following items must be submitted for evaluation before approval:

Full details of proposed design.

Sample extrusions (anodized) including interlocked deck joint, roof deck expansion joints, welded column/beam corner, beam cap, and rain cap.

Engineering calculations supporting physical properties of columns, beams, and decks.

Roll formed aluminum not acceptable.

LOAD REQUIREMENTS:

The system shall be designed to meet a minimum live load requirement of 25 pounds per square foot, wind load (uplift) of 25 pound per square foot) as required by local building code, and extruded aluminum roof deck and structure shall be able to withstand concentrated loads such as large hail and walking on top.

ENGINEERING PROPERTIES:

Component sizes: Roof Deck: 3" high x 6" wide.....(D-36)
 Fascia/Beam: 4" wide x 6" high.....(D-36)

Larger sizes to be used to meet span and load requirements.

Water shall drain internally from the deck through discharge scuppers at the end of the door canopy, toward appropriate drainage structure.

DOOR CANOPIES:

Shall be aluminum all extruded wall hung type canopy as Size as shown on the drawings. All sections shall be extruded aluminum alloy 6063 heat treated to maximum strength in T6 temper. The structure shall be designed to withstand walking on top, severe icing, heavy hail and hurricane winds. Finish of all sections shall be **baked enamel finish Hardcoat Bronze finish with integral color per AA-M10C22A42.** Color to **match existing canopies at existing building be dark bronze.** Provide flashing to match fascia color at walls. Underside of roof decking shall be baked enamel finish (color to **match existing canopies at existing building** as selected by Architect).

Flashing: All flashing shall match finish of canopies.

FINISH:

Finish shall be baked enamel finish anodized with integral AA-M10C22A42 for all columns, beams and top side of roof decking. Underside of roof decking shall be baked enamel finish. Colors to match existing canopies at existing building shall be as selected by Owner and Architect.

FLASHING: All flashing shall match finish of door, bus or walk canopies.

PART 3- EXECUTIONERECTION:

Erection shall be performed in accordance with approved shop drawings. Installation shall be scheduled after all concrete (except where bents are integral with walks), masonry and roofing work in the area are complete. Column sleeves and/or anchor bolts shall be provided by the Manufacturer. Canopy shall be installed plumb and level.

Downspout columns shall be filled with grout to the drainage hole to prevent standing water. Downspout deflectors shall be installed after grout.

Care shall be taken in erection not to scratch any component. Replace if damaged.

WORKMANSHIP:

Erection shall be performed by the manufacturer's approved representative. All workmanship must be of the very best, with neat mitered joints.

End of Section 059110

SECTION 061000 - CARPENTRYPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Definition: Rough carpentry includes carpentry work not specified as part of other sections and which is generally not exposed, except as otherwise indicated. Types of work in this section include rough carpentry for:

Wood grounds, nailers, blocking, sheathing, underlayment.

REFERENCES:

Lumber Standards: Manufacture lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood panels and, for products not manufactured under PS 1 provisions, with American Plywood Association (APA) "Performance Standard and Policies for Structural-Use Panels", Form No. E445.

Trademark: Factory-mark each construction panel with APA trademark evidencing compliance with grade requirements.

Concealed APA Performance-Rated Panels: Where construction panels will be used for the following concealed types of applications, provide APA Performance-Rated Panels complying with requirements indicated for grade designation, span rating, exposure durability classification, edge detail (where applicable) and thickness.

PRODUCT HANDLING:

Delivery and Storage: Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation within stacks.

JOB CONDITIONS:

Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

PART 2 - PRODUCTSMATERIALS:Lumber, General:

Factory-mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.

Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

Provide dressed lumber, S4S, unless otherwise indicated.

Provide seasoned lumber with 19% maximum moisture content at time of dressing.

No. 2 grade SYP.

Miscellaneous Lumber:

Provide wood for support or attachment of other work including cant strips, buck, nails, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes indicated, worked into shapes shown, and as follows:

Moisture content: 19% maximum for lumber items not specified to receive wood preservative treatment.

Grade: Construction Grade light framing size lumber of any species or board size lumber as required. Provide construction grade boards (RIS or WCLB) or No. 2 boards (SPIB or WWPA).

Plywood (Pw):

Trademark: Identify each plywood panel with appropriate APA trademark.

Combination subfloor underlayment shall have tongue and groove edges.

Exterior: EXT-DFPA C-D where not exposed.

Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire rated plywood panels with grade designation, APA C-D PLUGGED INT with exterior glue, in thickness indicated, or, if not otherwise indicated, not less than ¾".

Ice and Water Underlayment: W. R. Grace Ice and Water Shield; Atlas Storm Master DG Ice & Water Protection; GAF Stormguard Waterproof Underlayment; Owens Corning Weatherlock; or Johns-Manville Ice and Water Guard. Minimum 40 mil Ice and Water Underlayment required

WOOD TREATMENT:

Preservative Treatment: Where lumber or plywood is indicated as "Trt-Wd" or "Treated", or is specified herein to be treated, comply with applicable requirements of AWWPA Standards C2 (Lumber) and C9 (Plywood) and of AWPB standards listed below. Mark each treated item with the AWPB Quality Mark Requirements.

Pressure-treat above-ground items with water-borne preservatives complying with AWPB LP-2. After treatment, kiln-dry to a maximum moisture content of 15%.

Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.

Wood framing members less than 18" above grade.

Fire-retardant Treatment: Where "FR" or fire rated lumber or plywood is indicated, they shall be pressure treated with DRICON fire retardant chemicals by Hickson Corporation to meet UL requirements for FR-S rating. Each piece shall bear UL imprint attesting to this rating.

Other Acceptable Manufacturers Fire Retardant Treatment:

D-Blaze, Chemical Specialties, Inc.; Exterior Fire-X and Interior Pyro-Guard, Hoover Treated Wood Products, Inc.

Certification: Submit a certificate from the supplier of fire retardant treated plywood that the wood is DRICON treated.

Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

Fasteners for preservative treated wood and fire treated wood shall be non-corrosive. Consult manufacturer of treated wood for proper materials.

PART 3 - EXECUTIONINSTALLATION:General:

Discard units of material with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.

Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.

Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes.

Use common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

Where rough carpentry work is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners and anchorages with a hot-dip zinc (ASTM A 153).

Wood Grounds, Nailers, Blocking and Sleepers:

Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

Provide permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-½" wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

All fire retardant wood shall be isolated from contact with all metals by application of bituminous coating between or by other methods.

INSTALLATION OF WOOD BLOCKING:

Location: Install wood blocking to provide anchorage for other materials. Form blocking of nominal 2" thick material.

Masonry: Blocking built into masonry shall be cut to same size as masonry unit which it replaces. Set and anchor into masonry as the work progresses.

Steel: Blocking in conjunction with steel work shall be bolted to steel with bolts, washers and nuts.

Roofing: Form blocking in conjunction with gravel stops and roofs to shapes as detailed. Anchor with countersunk bolts, washer, and nuts.

Installation of Plywood:

General: Comply with applicable recommendations contained in Form No. E 304, "APA Design/Construction Guide - Residential & Commercial," for types of plywood products and applications indicated.

Fastening Methods: Fasten panels as indicated below:

Plywood Backing Panels and sheathing: Screw to supports.

End of Section 061000

SECTION 071100 - WATERPROOFINGPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

QUALITY ASSURANCE:

All waterproofing shall be inspected and approved by the Architect before any backfill or other surfacing is placed.

The waterproofing work shall be performed by a firm regularly engaged and specializing in work of the character required by the Contract and in the application of the materials specified herein. Materials shall be delivered to job in manufacturer's original unopened containers with manufacturer's brand and name clearly marked thereon.

Proceed with waterproofing work only after substrate construction and penetrating work has been completed.

The installer must examine the substrate and the conditions under which waterproofing and dampproofing work is to be performed, and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in manner acceptable to the Installer.

Weather Conditions: Proceed with waterproofing work only when weather conditions comply with manufacturer's recommendations, and will permit the materials to be applied in accordance with the recommendations.

Warranty: Contractor shall furnish five (5) year warranty against leakage from material and/or labor defects.

SUBMITTALS:

Product Data: For each type of product. Include construction details, material descriptions and manufacturer's written instructions for evaluating, preparing, and treating substrate.

PART 2 - PRODUCTSMEMBRANE WATERPROOFING:

The areas to receive membrane waterproofing shall be as shown on the drawings and shall include all walls where floor slab is below grade.

Materials: Polyguard No. 650 Primer 650 membrane, No. 650 mastic, distributed by Corrosion Specialties, Atlanta, Georgia, manufactured by Polyguard Pipeline Products, Inc.

PROTECTION COURSE: In-plane drainage mat specified and installed under Section 027100.

OTHER APPROVED MEMBRANE WATERPROOFING:

Flintkote 710-01, Primer 710-23 Trowelmastic mastic, and 990-06 glass membrane. Install in strict accordance with manufacturer's recommendations. Koppers KMM Vertical Waterproofing System Spec.No.640. Nervastral 300 system. W.R. Meadows Melnar. W. R. Grace Bituthene sheet membrane, Neogard Corp. Perma-Gard.

ONLY MEMBRANE TYPE WATERPROOFING MATERIALS WILL BE APPROVED.

PART 3 - EXECUTIONMembrane Waterproofing:

Preparation of Surfaces: Surfaces to be waterproofed shall be smooth and free from holes or projections which might cause puncture of the membrane. The surface shall be dry and thoroughly cleaned to remove dust and loose materials immediately before application of the waterproofing. Do not apply waterproofing where effects of freezing or moisture will adversely affect the waterproofing application. Mortar joints shall be filled and flush.

Concrete shall be cured a minimum of seven days before application. Surfaces to be totally dry for best adhesion. If forming pans are used, they shall be removed a minimum of three days before application of membrane.

Surface shall be free of voids, sharp protrusions, loose aggregate, form release agents, or other contaminates. Any voids, etc. shall be repaired prior to application.

APPLICATION:

Membrane shall be applied only when air temperature, surface temperature, and material temperature are above 40 degrees F.

Prime all surfaces with Polyguard 650 Primer stirred each day before use. Application shall be by brush, roller, or spray and shall be a maximum rate of 200 square feet per gallon.

Primed surfaces must be reprimed if the membrane is not applied within twenty-four hours.

Membrane shall not be left exposed to ultra-violet rays for a period exceeding five days without a protection board or a protective coating.

Polyguard Membrane shall only be applied by workmen skilled in waterproofing material application.

Extreme caution shall be taken during application to prevent the contact of the rubberized asphalt element of the waterproofing membrane with any product containing coal tar, coal tar pitch, or its derivatives.

When applying Polyguard Membrane on vertical walls, assure complete adhesion of the membrane to the primed wall surface. Accomplish by the pressure of smoothing out the surface of the membrane as it is applied. Also, do on all overlaps to achieve a waterproof seal between the membrane surfaces.

Reinforce all outside angles by applying a 6" wide piece of membrane centered on the corner. Cant all inside corners. All side laps and end laps should be reinforced with a 4" wide strip of membrane solvent bonded to the first layer of membrane.

When vertical sections of more than eight feet are to be coated, apply the membrane in sections no longer than eight feet. These sheets shall be applied starting from the lower foundation base and rising to the top with the two and one-half inch overlap shingling down on each ply of material.

A bead of Polyguard No. 650 Mastic shall be applied around the edges of the membrane at the termination of each work day or in the event of an interruption due to construction progress.

The upper edge of the Polyguard Waterproofing Membrane and the protective coating shall be counterflushed. When necessary, fillets made with an epoxy mortar or a modified latex cement shall be used for cant strips on inside corners.

End of Section 071100

SECTION 071600 - DAMPPROOFINGPART -1 GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

PROJECT CONDITIONS:

All dampproofing shall be inspected and approved by the Architect before other surfacing is placed.

Proceed with dampproofing work only after substrate construction and penetrating work has been completed.

The Installer must examine the substrate and the conditions under which dampproofing work is to be performed and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

Weather Conditions: Proceed with dampproofing work only when weather conditions comply with manufacturer's recommendations and will permit the materials to be applied in accordance with the recommendations.

PART 2 - MATERIALS

Material: Sonneborn, "Hydrocide Semi-Mastic"; Gibson-Homans, Eterna-flex 8225 brush grade"; Chem-Masters Corp. "Mastergard 400"; Flintkote 710-09 semi-mastic, W. R. Meadows "Sealmastic".

PART 3 - EXECUTION

Install dampproofing in accordance with manufacturer's recommendations.

Apply one coat dampproofing to exterior face of exterior concrete masonry units or concrete at all exterior walls. Completely fill all concrete block pores. Install dampproofing on masonry before installation of rigid wall insulation.

End of Section 071600

SECTION 072000 - BUILDING INSULATIONPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of insulation work is shown on drawings and indicated by provisions of this section. Applications of insulation specified in this section include the following:

Board-type building insulation, concealed.

Blanket -type building insulation.

Foamed in Place Acoustical Fill

QUALITY ASSURANCE:

Thermal Conductivity: Thicknesses indicated are for thermal conductivity (k-value at 75 degrees F or 24 degrees C) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide appropriate thickness required to achieve indicated value.

Fire and Insurance Ratings: Comply with fire-resistance, flammability and insurance ratings indicated, and comply with regulations as interpreted by governing authorities.

PRODUCT HANDLING:

General Protection: Protect insulations from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

Protection for plastic insulation:

Do not expose to sunlight, except to extent necessary for period of installation and concealment.

Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time. Complete installation and concealment of plastic materials as rapidly as possible in each area of work.

PART 2 - PRODUCTS

Mineral/Glass Fiber Blanket/Batt Insulation (M/GFB-Ins): Inorganic (non-asbestos) fibers formed with binders into resilient flexible blankets or semi-rigid batts; HH-I-521, Type as indicated, densities of not less than 0.5 lb. per cu. ft. for glass fiber units and not less than 2.5 lb. per cu. ft. for mineral wool units, k-value of 0.27; manufacturer's standard lengths and widths as required to coordinate with spaces to be insulated. Types as follows:

Provide Type II nonreflective vapor barrier units, barrier rating of 0.5 perms, other face (if any) with rating greater than 5.0 perms. Provide in walls and ceilings where required. Provide "R" number shown on drawings. Vapor barriers exposed above ceilings shall have surfacing with flame spread not to exceed: 25, with a smoke developed index of not more than 450 as determined in accordance with ASTM E 84.

Wall Insulation:

Extruded Polystyrene Board Insulation (EPsBd-Ins): Close-cell, polystyrene beads molded into rigid boards, complying with FS HH-I-524, Type IV, 25 psi min. compressive strength; 0.1% maximum water absorption; k-value of 0.20; 1.0 perm-inch max. water vapor transmission; manufacturer's standard lengths and widths.

Units shall be Dow Styrofoam Brand SB, Amoco Amafoam SB, UC Industries Formular 250.

Units shall be 2-½" thick at walls with a minimum of R 5 per inch.

Insulation at walls shall be as shown on drawings.

Foamed in Place Acoustical Fill: Shall be Core Fill 500 Foam Insulations manufactured by Tailored Chemical Company, Hickory, NC (704)322-6512.

Installation shall be in accordance with the manufacturer's directions by a licensed and certified applicator by Tailored Chemical Co.. Material shall be foamed in place to completely fill all voids in block walls.

Saw cut in the bottom block an inspection opening 3" x 4" wide at the floor for inspection purposes. Opening to occur at every 6th block. Fill opening with mortar after completion of insulation.

Install acoustical fill where shown on the drawings.

Auxiliary Insulating Materials:

Adhesive for Bonding Insulation: Type recommended by insulation manufacture, and complying with fire-resistance requirements.

Mechanical Anchors: Type and size shown or, if not shown, as recommended by insulation manufacturer for type of application and condition of substrate.

Mastic Sealer: Type recommended by insulation manufacturer for bonding edge joints between units and filling voids in work.

PART 3 - EXECUTION

INSPECTION AND PREPARATION:

Installer must examine substrate and conditions under which insulation work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with insulation work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

Clean substrate of substances harmful to insulations or vapor barriers, including removal of projections which might puncture vapor barriers.

INSTALLATION:

Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement. Rigid wall insulation shall provide continuous plane, no gaps, with joints taped and/or foamed.

Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

PROTECTION:

General: Protect installed insulation and vapor barriers from harmful weather exposures and from possible physical abuses, where possible by non-delayed installation of concealing work or where that is not possible, by temporary covering or enclosure. Installer shall advise Contractor of exposure hazards, including possible sources of deterioration and fire hazards.

End of Section 072000

SECTION 072440- EXTERIOR WALL FINISH SYSTEMPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent of exterior insulation and wall finish systems is indicated on drawings.

Types of exterior insulation and wall finish system applications in this section include the following:

Class PB Type A polymer-based protective finish coating (Class PB), utilizing a cavity wall concept with capability for moisture drainage. The system shall consist of a water-resistive barrier coating (air/water-resistive barrier) adhesive, grooved expanded polystyrene insulation board vent track/vent assembly, base coat, reinforcing meshes (2-layers) and finish.

Sealing joints is specified in this section.

DEFINITIONS:

Exterior wall system refers to an exterior assembly composed of an inner layer of thermal insulation board and an outer layer forming the protective finish coating. The assembly is applied to a supporting substrate of construction indicated. Designations below for the class and type of exterior insulation and finish system specified in this section are based on those developed by the Exterior Insulation Manufacturers Association (EIMA).

Class PB Type A designates a polymer-based protective finish coating (Class PB), externally reinforced (Type A).

System in this section refers to Class PB Type A moisture draining, exterior insulation and finish systems with two layers of reinforcing mesh, except where noted on drawings to be single layer.

System manufacturer refers to the manufacturer of the exterior insulation and finish system.

SYSTEM DESCRIPTION:

Provide system complying with the following performance requirements:

Bond Integrity: Free from bond failure within system components or between system and supporting wall construction, resulting from exposure to fire, wind loads, weather or other in-service conditions.

Weathertightness: Resistant to water penetration from exterior into system and assemblies behind it or through them into interior of building which results in deterioration of thermal-insulating effectiveness or other degradation of system and assemblies behind system including substrates, supporting wall construction, and interior finish.

Moisture-draining: Capable of draining incidental moisture from the system using a grooved polystyrene and air/water-resistive barrier coating

SUBMITTALS:

Product Data: Manufacturer's technical data for each component of exterior insulation and finish system.

Shop Drawings showing fabrication and installation of system including plans, elevations, sections, details of components, joint locations and configurations within system and between system and construction penetrating it, and attachments to construction behind system.

Samples for Initial Selection Purposes: Manufacturer's standard color charts and small scale samples indicating textural choices available.

Submit sealant manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available.

Samples for verification purposes in the form of 2-foot-square panels for each finish, color, and texture specified. Prepare samples using same tools and techniques intended for actual work.

Incorporate within each sample a typical control joint filled with sealant of color indicated or selected.

QUALITY ASSURANCE:

Manufacturer Qualifications: Firm regularly engaged in manufacturing products for system indicated and with at least 5 years successful experience in applications similar to that required for this Project.

Installer Qualifications: Engage an Installer that is certified in writing by system manufacturer as qualified for installation of systems indicated.

Single Source Responsibility: Obtain materials for system from either a single manufacturer or from manufacturers approved by the system manufacturer as compatible with other system components.

Field-constructed Mock-Up: Prior to installation of system, erect mock-ups for each form of wall construction and finish required to verify selections made under sample submittals and to demonstrate esthetics effects including those related to execution. Build mock-ups to comply with the following requirements, using materials indicated for final work.

WARRANTY:

Provide five year non-prorated material and labor guarantee against failures in watertightness, discoloration, adhesion and other visual, thermal and/or moisture entry defects.

DELIVERY, STORAGE, AND HANDLING:

Deliver products in original, unopened packages with manufacturer's labels identifying products legible and intact.

Store materials inside and under cover; keep them dry, protected from the weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, damage from construction traffic and other causes.

Stack insulation board flat and off the ground.

PROJECT CONDITIONS:

Environmental Conditions: Do not install system when ambient outdoor temperatures are 40 deg F (4 deg C) and falling unless temporary protection and heat is provided to maintain ambient temperatures above 40 deg F (4 deg C) during installation of wet materials and for 24 hours after installation or longer to allow them to become thoroughly dry and weather resistant.

SEQUENCING AND SCHEDULING:

Sequence installation of system with related work specified in other sections to ensure that wall assemblies, including flashing, trim and joint sealers, are protected against damage from weather, aging, corrosion or other causes.

PART 2 - PRODUCTS

MANUFACTURERS:

Manufacturers: Subject to compliance with requirements (including requirements for two layers mesh as specified), provide Class PB Type A system of one of the following:

Dryvit
Finestone
Parex Commercial

MATERIALS:

Compatibility: Provide air/water - resistive barrier, adhesive, board insulation, reinforcing fabrics, base and finish coat materials, sealants and accessories which are compatible with one another and approved for use by system manufacturer.

Provide colors and texture of protective coating to comply with following requirements:

Match color and texture indicated by reference to manufacturer's standard designations for these characteristics.

Surface-Sealer: System manufacturer's standard adhesion intermediary designed to improve bond between substrate of type indicated and adhesive for application of insulation.

Air/Water - Resistive Barrier: A flexible polymer-based, non-cementitious water-resistive smooth coating.

Vent Assembly: Manufacturer's standard vent assembly.

Adhesive for Application of Insulation: System manufacturer's standard formulation designed for indicated use, compatible with substrate and complying with the following requirements:

Factory-mixed formulation designed for adhesive attachment of insulation to substrates of type indicated, as approved by system manufacturer.

Molded Polystyrene Board Insulation: Rigid, cellular thermal insulation formed by the expansion of polystyrene resin beads or granules in a closed mold to comply with ASTM C 578 for Type I; aged in block form prior to cutting and shipping by air drying for not less than 6 weeks or by another method approved by system manufacturer and producing equivalent results; 2' x 4' x 2" thick, and complying with requirements of system manufacturer for corner squareness and other dimensional tolerances. The backside of the insulation board shall have 1" x ¼" grooves running vertically and spaced 12" on center.

Reinforcing Fabric: Balanced, alkali-resistant open weave glass fiber fabric treated for compatibility with other system materials; made from continuous multi-end strands with tensile strength of not less than 145 lbs. and 150 lbs. in warp and fill directions, respectively, per ASTM D 1682 and complying with ASTM D 578 and the following requirements for minimum weight:

Standard Reinforcing Fabric: 4.3 oz. per sq. yd. min.

Impact Resistant Reinforcing Fabric: 15.0 oz. per sq. yd.

Base and second coat Materials: System manufacturer's standard, job-mixed formulation of portland cement complying with ASTM C 150, Type I, white or natural color; and system manufacturer's standard polymer-based adhesive designed for use indicated.

Finish Coat Materials: System manufacturer's standard mixture complying with the following requirements for material composition and method of combining materials:

Factory-mixed formulation of polymer emulsion admixture, color-fast mineral pigments, mildicide, sound stone particles, and fillers.

Water: Clean and potable.

ELASTOMERIC SEALANTS:

Sealant Products: Provide manufacturer's standard chemically curing, elastomeric sealant which is compatible with joint fillers, joint substrates, and other related materials and complies with requirements of Division-7 section "Joint Sealers" for products corresponding to description indicated below.

Multi-Part Nonsag Urethane Sealant.

Sealant Color: Provide color of exposed sealants to comply with the following requirement:

Match finish coat color of system.

MIXING:

General: Comply with system manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as approved by system manufacturer. Mix materials in clean containers. Use materials within time period specified by system manufacturer or discard.

PART 3 - EXECUTION

EXAMINATION:

Examine substrates, with Installer present, to determine if they are in satisfactory condition for installation of system. Do not proceed with installation of system until unsatisfactory conditions have been corrected.

PREPARATION:

Protect contiguous work from moisture deterioration and soiling resulting from application of systems. Provide temporary covering and other protection needed to prevent spattering of exterior finish coatings on other work.

Protect system, substrates and wall construction behind them from inclement weather during installation. Prevent infiltration of moisture behind system and deterioration of substrates.

Substrate Preparation: Prepare and clean substrates to comply with system manufacturer's requirements to obtain optimum bond between substrate and adhesive for insulation.

Apply surface-sealer over substrates where required by system manufacturer for improving adhesion.

INSTALLATION:

General: Comply with system manufacturer's current published instructions for installation of system as applicable to each type of substrate indicated.

Install air/water - resistive barrier per manufacturer's instructions.

Adhesively attach insulation to comply with the following requirements:

Allow adhered insulation to remain undisturbed for period prescribed by system manufacturer but not less than 24 hours, prior to beginning rasping and sanding insulation or application of base coat and reinforcing fabric.

Apply boards over dry substrates in courses with long edges oriented horizontally; begin first course from a level base line and work upwards.

Stagger vertical joints in successive courses to produce running bond pattern.

Offset joints of insulation from joints in sheathing.

Abut boards tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between insulation boards. If gaps occur, fill with insulation cut to fit gaps exactly; insert without use of adhesive.

Rasp or sand flush any irregularities projecting more than 1/32" from surface of insulation; do not create depressions deeper than 1/16".

Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes conforming to details indicated.

Interrupt insulation where expansion joints are indicated in substrates behind exterior insulation and finish systems.

Form joints for sealant application by leaving gaps of width needed between adjoining insulation edges as well as between insulation edges and dissimilar adjoining surfaces projecting through insulation that produce joint widths indicated after encapsulation of joint substrates with base coat, reinforcing fabric and finish coat.

Cut grooves, rabbets and other features in outside face of insulation with high-speed router and bit configured to produce grooves, rabbets and other features that conform accurately to profiles and locations indicated. Do not reduce insulation thickness at features to less than 3/4 inch.

Treat exposed edges of insulation board, including those forming substrates of sealed joints within system or between system and other work, by encapsulating with base coat, reinforcing fabric and finish coat.

Coordinate flashing installation with installation of insulation to produce a wall system which does not allow water to penetrate behind protective coating.

Apply base coat to exposed surfaces of insulation in minimum thickness specified by system manufacturer.

Fully embed reinforcing fabric of weight indicated below in wet base coat to produce wrinkle-free installation with fabric continuous at corners and lapped or otherwise treated at joints to comply with system manufacturer's requirements.

Standard Reinforcing Fabric: 4.3 oz. per sq. yd. min.

Second Base Coat: Apply a second base coat and second layer of reinforcing fabric of weight indicated below, in same manner as first application. Do not apply until first base coat has cured.

Impact Resistant Reinforcing Fabric: 15.0 oz. per sq. yd.

Apply finish coat over dry base coat in thickness required by system manufacturer to produce a uniform finish of texture and color matching approved sample.

Apply finish coat directly to exposed cast in place concrete column.

INSTALLATION OF JOINT SEALANTS:

Prepare joints and apply sealants, of type and at locations indicated, to comply with applicable requirements of Division-7 section "Joint Sealers".

CLEANING AND PROTECTION:

Remove temporary covering and protection of other work. Promptly remove protective coatings from window and door frames, and any other surfaces outside areas indicated to receive protective coating.

Provide final protection and maintain conditions, in a manner acceptable to Installer and system manufacturer, which ensures system being without damage or deterioration at time of Substantial Completion.

End of Section 072440

SECTION 072510 - SPRAYED-ON-FIREPROOFINGPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY:

This Section includes the following:

Cementitious Concealed sprayed-on fireproofing for 2-HR ratings, see drawings for conditions.

DEFINITIONS:

Concealed sprayed-on fireproofing refers to applications where sprayed-on materials are applied to surfaces that are concealed from view behind other construction when the Work is completed.

SUBMITTALS:

Product data for each sprayed-on fireproofing product indicated.

Certification by manufacturers that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

Shop drawings in form of structural framing plans indicating the following:

Where and what kinds of surface preparations are required before applying fireproofing.

Extent of sprayed-on fireproofing for each different construction and fire-resistance rating including the following:

Applicable fire-resistive design designations of inspecting and testing agency acceptable to authorities having jurisdiction.

Minimum thicknesses needed to achieve required fire-resistance ratings of structural components and assemblies.

Designation of restrained and unrestrained conditions based on definitions in ASTM E 119, Appendix X3 as determined by a qualified professional engineer.

Treatment of fireproofing after its application.

Product certificates from fireproofing manufacturers that each sprayed-on fireproofing product indicated for Project complies with specified requirements including those for fire-test-response characteristics and compatibility with adhesives, primers, and other surface coatings on substrates indicated to receive fireproofing.

Results from tests and inspections performed by Owner-employed independent testing agency will be reported promptly to Architect and Contractor.

Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

QUALITY ASSURANCE:

Fire-Test-Response Characteristics: Provide sprayed-on fireproofing products identical to those used in assemblies tested for the following fire-test-response characteristics, per test method indicated below, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify packages (bags) containing fireproofing with appropriate classification markings of applicable testing and inspecting agency.

Fire-Resistance Ratings: As indicated by reference to fire-resistive designs listed in UL "Fire Resistance Directory," or in the comparable publication of another testing and inspecting agency acceptable to authorities having jurisdiction, for fire-resistive assemblies where sprayed-on fireproofing serves as direct-applied protection, tested per ASTM E 119.

Surface-Burning Characteristics: As indicated for each sprayed-on fireproofing product required, tested per ASTM E 84.

Installer Qualifications: Engage an experienced Installer certified, licensed, or otherwise qualified by the sprayed-on fireproofing manufacturer as having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its sprayed-on fireproofing products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

Single-Source Responsibility: Obtain sprayed-on fireproofing materials from a single manufacturer for each different product required.

Owner will employ and pay a qualified independent testing agency to perform field quality-control testing services specified in Part 3 of this Section.

Testing Agency Qualifications: To qualify for acceptance, an independent testing agency hired by Contractor or manufacturer to test sprayed-on fireproofing products must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct satisfactorily the testing indicated.

Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing structural engineering services of the kind indicated that have resulted in the installation of structural systems similar to this Project in material, design, and extent with a record of successful in-service performance.

Provide fireproofing products containing no detectable asbestos as determined according to the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, Polarized Light Microscopy.

Field-Constructed Mockups: Prior to installing sprayed-on fireproofing, apply each product specified for exposed applications to demonstrate both aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.

Locate mockups on site in location or, if not indicated, directed by Architect.

Extent of Mockups: Approximately 100 sq. ft. of surface for each product indicated.

Notify Architect one week in advance of the dates and times when mockups will be erected.

Demonstrate the proposed range of aesthetic effects and workmanship.

Obtain Architect's acceptance of mockups before start of final unit of Work.

Retain and maintain mockups during construction in undisturbed condition as a standard for judging completed unit of Work.

When directed, demolish and remove mockups from Project site.

Accepted mockups in undisturbed condition at time of Substantial Completion may become part of completed unit of Work.

DELIVERY, STORAGE, AND HANDLING:

Deliver products to Project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; shelf life, if applicable; and fire-resistance ratings applicable to Project.

Use materials with limited shelf life within period indicated. Remove from Project site and discard any materials whose shelf life has expired.

Store sprayed-on fireproofing materials inside, under cover, above ground, so they are kept dry until ready for use. Remove from Project site and discard any materials that have deteriorated.

PROJECT CONDITIONS:

Environmental Conditions: Do not install sprayed-on fireproofing when ambient or substrate temperatures are 40 deg F (4.4 deg C) and falling, unless temporary protection and heat is provided to maintain temperatures at or above this level for 24 hours before, during, and for 24 hours after applying sprayed-on fireproofing.

Ventilation: Ventilate sprayed-on fireproofing by natural means or, where this is inadequate, forced-air circulation during and after application until fireproofing dries thoroughly.

SEQUENCING:

Sequence and coordinate application of sprayed-on fireproofing with other related work specified in other Sections to comply with the following requirements:

Provide temporary enclosures to prevent deterioration of sprayed-on fireproofing for interior applications due to exposure to unfavorable environmental conditions.

Avoid unnecessary exposure of sprayed-on fireproofing to abrasion and other damage likely to occur during construction operations subsequent to its application.

Do not apply fireproofing to metal roof decking substrates until roofing has been completed; prohibit roof traffic during application and drying of fireproofing.

Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.

Defer installing ducts, piping, and other items that would interfere with applying fireproofing until fireproofing is installed.

Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, tested, and corrections have been made to any defective fireproofing.

WARRANTY:

General: The warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

Warranty: Submit a written warranty, executed by Contractor and cosigned by Installer, agreeing to repair or replace sprayed-on fireproofing that has failed within the specified warranty period. Failures include but are not limited to the following:

Cracking, flaking, eroding in excess of specified requirements, peeling, and delaminating of sprayed-on fireproofing from substrates due to defective materials and workmanship within the specified warranty period.

Not covered under the warranty are failures attributable to damage by occupants and Owner's maintenance personnel, exposure to environmental conditions other than those investigated and approved during fire-response testing, and to other causes not reasonably foreseeable under conditions of normal use.

Warranty Period: 2 years from date of building Substantial Completion.

PART 2 - PRODUCTS

CONCEALED SPRAYED-ON FIREPROOFING MATERIALS:

General: For concealed applications of sprayed-on fireproofing provide manufacturer's standard products complying with requirements indicated in this article for material composition and physical properties representative of installed products.

Material Composition:

Cementitious fireproofing consisting of factory-mixed, dry formulation of gypsum or portland cement binders and lightweight mineral or synthetic aggregates mixed with water at Project site to form a slurry or mortar for conveyance and application.

Physical Properties: Minimum values, unless otherwise indicated or higher values required to attain designated fire-resistance ratings, measured per standard test methods referenced with each property listed below:

Bond Strength: 200 lbf per sq. ft. as determined per ASTM E 736 under the following conditions:

Field test sprayed-on fireproofing that is applied to flanges of wide-flange structural steel members on surfaces matching those that will exist for remainder of steel receiving fireproofing.

If surfaces of structural steel receiving sprayed-on fireproofing are primed or otherwise painted, perform series of bond tests specified in UL "Fire Resistance Directory" for coating materials.

Minimum sprayed-on fireproofing thickness tested in laboratory shall be 0.75 inch.

Compressive Strength: 5.21 lbf per sq. inch as determined in the laboratory per ASTM E 761. Minimum sprayed-on fireproofing thickness tested shall be 0.75 inch and the minimum dry density shall be as specified, but not less than 15 pcf.

Corrosion Resistance: No evidence of corrosion as determined per ASTM E 937.

Deflection: No cracking, spalling, delamination or the like as determined per ASTM E 759.

Effect of Impact on Bonding: No cracking, spalling, delamination or the like as determined per ASTM E 760.

Air Erosion: Maximum weight loss of .005 gram per sq. ft. in 24 hours as determined per ASTM E 859. For laboratory tests, the minimum sprayed-on fireproofing thickness is 0.75 inch, the maximum dry density is 15 pcf, test specimens are not prepurged by mechanically induced air velocities, and tests are terminated after 24 hours.

Dry Density: 15 pcf for average and individual densities regardless of density indicated in referenced fire-resistive design, or greater if required to attain fire-resistance ratings indicated, as determined per ASTM E 605 or Appendix A "Alternate Method for Density Determination" of AWCI Technical Manual 12-A.

Thickness: Provide minimum average thickness required for fire-resistive design indicated according to the following criteria, but not less than 0.375 inch, as determined per ASTM E 605.

Where the referenced fire-resistive design lists a thickness of one inch or greater, the minimum allowable individual sprayed-on fireproofing thickness is the design thickness minus 0.25 inch.

Where the referenced fire-resistive design lists a thickness of less than one inch but more than 0.375 inch, the minimum allowable individual sprayed-on fireproofing thickness is the greater of 0.375 inch or 75 percent of the design thickness.

No reduction in average thickness is permitted for those fire-resistive designs whose fire resistance ratings were established at densities of less than 15 pcf.

Surface-Burning Characteristics: Maximum flame-spread value of 0 and smoke-developed value of 0.

Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Products: Subject to compliance with requirements, provide one of the following:

Cementitious Fireproofing:

Pyrolite 1, Carbolite Fireproofing Products Div., Carbolite Co.

Monokote Type MK-6/HY, Construction Products Div., W.R. Grace & Co.--Conn.

CAFCO 300, Isolatek International Corp.

Mandolite CP2, Mandoval Vermiculite Products, Inc.

AUXILIARY FIREPROOFING MATERIALS:

General: Provide auxiliary fireproofing materials that are compatible with sprayed-on fireproofing products and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in the fire-resistive designs indicated.

Substrate Primers: For use on each different substrate and with each different sprayed-on fireproofing product, provide primer that complies with one or more of the following requirements:

Primer's bond strength complies with requirements specified in UL "Fire Resistance Directory" for coating materials based on a series of bond tests per ASTM E 736.

Primer is identical to those used in assemblies tested for the fire-test-response characteristics of sprayed-on fireproofing, per ASTM E 119, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

Adhesive for Bonding Fireproofing: Product approved by manufacturer of sprayed-on fireproofing.

Metal Lath: Expanded metal lath fabricated from material of weight, configuration and finish required to comply with fire-resistive designs indicated and fireproofing manufacturer's recommendations. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive fireproofing.

Reinforcing Fabric: Glass-fiber fabric of type, weight, and form required to comply with fire-resistive designs indicated, approved by manufacturer of intumescent mastic fireproofing.

PART 3 - EXECUTIONEXAMINATION:

Examine substrates with Installer present to determine if they are in satisfactory condition to receive sprayed-on fireproofing. A substrate is in satisfactory condition if it complies with the following:

Substrates comply with requirements in the Section where the substrate and related materials and construction are specified.

Substrates are free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt, or other foreign substances capable of impairing bond of fireproofing with substrate under conditions of normal use or fire exposure.

Objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.

Substrates are not obstructed by ducts, piping, equipment, and other suspended construction that will interfere with applying the fireproofing.

Conduct tests according to sprayed-on fireproofing manufacturer's recommendations to verify that substrates are free of oil, rolling compounds, and other substances capable of interfering with bond where there is any doubt as to their presence.

Do not proceed with installation of fireproofing until unsatisfactory conditions have been corrected.

PREPARATION:

Clean substrates of substances that could impair bond of fireproofing, including oil, grease, rolling compounds, incompatible primers, and loose mill scale.

Prime substrates where recommended by fireproofing manufacturer, except where compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.

For exposed sprayed-on fireproofing applications, repair substrates to remove any surface imperfections that could affect uniformity of texture and thickness in finished fireproofing surface. Remove minor projections and fill voids that would telegraph through fireproofing after application.

Cover other work subject to damage from fall-out or overspray of fireproofing materials during application. Provide temporary enclosure as required to confine spraying operations, protect the environment, and ensure maintaining adequate ambient conditions for temperature and ventilation.

INSTALLATION, GENERAL:

Comply with fireproofing manufacturer's instructions for mixing materials, application procedures, and types of equipment used to convey and spray on fireproofing materials; as applicable to the particular conditions of installation and as required to achieve fire-resistance ratings indicated.

Apply sprayed-on fireproofing that is identical to products tested as specified in Part 1 under "Test Reports" in "Submittals" article, with respect to rate of application, use of sealers, topcoats, tamping, troweling, water overspray, or other materials and procedures affecting test results.

Install metal lath, as required, to comply with fire-resistance ratings and recommendations of fireproofing manufacturer for conditions of exposure and intended use. Securely attach lath to substrate in position required for support and reinforcement of fireproofing. Use anchorage devices of type recommended by fireproofing manufacturer. Attach lathing accessories where indicated or required.

Coat substrates with adhesive prior to applying fireproofing where required to achieve fire-resistance rating or as recommended by fireproofing manufacturer for material and application indicated.

Extend fireproofing in full thickness over entire area of each substrate to be protected. Unless otherwise recommended by fireproofing manufacturer, install body of fireproof covering in a single course.

Apply fireproofing materials by sprayed-on method to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended by manufacturer.

For applications over encapsulant materials, including lockdown (post-removal) encapsulants, apply sprayed-on fireproofing that differs in color from that of the encapsulant over which it is applied.

INSTALLING CONCEALED FIREPROOFING:

Apply concealed fireproofing in thicknesses and densities indicated but not less than those required to achieve fire-resistance ratings designated for each condition and comply with requirements for thickness specified in Part 2 "Concealed Fireproofing" article.

FIELD QUALITY CONTROL:

Testing Agency: A qualified independent testing agency employed and paid by Owner will perform field quality-control testing.

Extent and Testing Methodology: Testing of completed fireproofing will take place in successive stages in areas of extent described below; do not proceed with fireproofing of next area until test results for previously completed fireproofing show compliance with requirements.

Extent of Each Test Area: Each bay, 10,000 sq. ft. of floor area, or total floor area, whichever produces greatest number of test areas.

Within each area, testing agency will randomly select one structural member of each type (primary beam, secondary beam, joist, truss, steel deck, and column) and test fireproofing as follows:

For cohesion and adhesion per ASTM E 736.

For thickness and density per ASTM E 605-93.

Lower flanges and webs of beams, column webs, column flanges, and floor deck for density per ASTM E 605 or Appendix A "Alternate Method for Density Determination" of AWCI Technical Manual 12-A.

When testing discovers fireproofing not in compliance with requirements, testing agency will perform additional random testing to determine extent of noncompliance.

Testing agency will report test results promptly and in writing to Contractor and Architect.

Remove and replace fireproofing where test results indicate that it does not comply with specified requirements for cohesion and adhesion or for density or both.

Apply additional fireproofing per manufacturer's directions where test results indicate that the thickness does not comply with specified requirements.

Additional Testing: Where fireproofing is removed and replaced or repaired, additional testing will be performed to determine compliance with specified requirements.

CLEANING, REPAIR, AND PROTECTION:

Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material over-spray and fall-out from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

Cure exposed cementitious fireproofing materials according to fireproofing manufacturer's recommendations to prevent premature drying.

Protect fireproofing, according to advice of fireproofing manufacturer and Installer, from damage resulting from construction operations or other causes so that fireproofing will be without damage or deterioration at time of Substantial Completion.

Coordinate installation of fireproofing with other construction to minimize the need to cut or remove fireproofing. As installation of other construction proceeds, inspect fireproofing and patch any areas where fireproofing was removed or damaged.

Repair or replace work that has not been successfully protected.

End of Section 072510

SECTION 072511 - INTUMESCENT FIREPROOFINGPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SECTION INCLUDES:

Spray applied, subliming/thin film intumescent, fire resistive coating for interior structural steel framing. Fire resistive coating shall be supplied as a ready to use, single package coating, applied over a suitable primer. Only trained, qualified contractors shall apply materials.

RELATED SECTIONS:

Section 051200 - Structural Steel
Section 055000 - Metal Fabricators
Section 099000 - Painting

REFERENCE:

American Society for Testing and Materials (ASTM):

ASTM E 119 - Test Method for Fire Tests of Building Construction and Materials. (UL 263 and NFPA 251)

ASTM E 84 - Test for Surface Burning Characteristics of Building Materials.

Association of the Wall and Ceiling Industries International (AWCI): Inspection Procedure for Field Applied Sprayed Fire Protection Materials.

Steel Structures Painting Council (SSPC): Paint Application Specification No. 2, Measurement of Dry Paint Thickness with Magnetic Gages.

Underwriter's Laboratories, Inc. (UL): Directory of Listed Products

PERFORMANCE REQUIREMENTS:

Fire resistive coating at a thickness to achieve a 1 (one) hour fire rating to the specified items (beams, columns, support plates, etc.).

Surface Burning Characteristics: Class A (Tested to ASTM E 84)

Flame Spread: ≤ 25
Smoke Developed: ≤ 25

Fire Resistive Ratings: 1 (one) hour fire rating as indicated on the drawings.

SUBMITTALS:

Shop Drawings: Show locations and fire resistive coating design.

Product Data: Published fire resistive coating description, performance characteristics and limitations.

Test Documentation: Underwriter's Laboratories, Inc. (UL) certification with design data, material thickness and substrate described.

Manufacturer's Instructions: Application manual (latest revision) with special requirements, procedures and conditions.

Manufacturer's Certification:

Approved applicator certification.
Product Data Sheets and Material Safety Data Sheets.

QUALIFICATIONS:

Applicator: Successful experience in work of this type; trained and certified by manufacturer.

Manufacturer: 10 years experience in manufacturing subliming/intumescent fire resistive coatings.

Comply with applicable building codes for fire resistive coatings to provide the required fire resistance to structural steel columns, beams, support plates, etc. (or those as designated in the plans and/or drawings).

Independent Inspection: Testing and laboratory services required for work of this Section, as specified. Testing in accordance with SSPC using magnetic gages.

Fire Testing and Certification by Independent Laboratories: Underwriter's Laboratories, Inc. (UL) documentation to acceptable building code.

Volatile Organic Compound (VOC) Content: Less than 350 grams per liter.

SAMPLE INSTALLATION:

Prior to actual start up, a sample installation shall be prepared and submitted following all specified procedures. Representatives of all interested parties having a vested interest in the installation shall then approve this sample installation.

DELIVERY, STORAGE AND HANDLING:

Comply with manufacturer's written instructions. Deliver material in sealed, undamaged containers with appropriate labels. Use coating within the specified shelf life. Remove from project site all coatings whose shelf life has expired. Store coating in strict accordance to manufacturer's written instructions.

ENVIRONMENTAL REQUIREMENTS:

Air and Substrate Temperature: Comply with manufacturer's application manual (latest revision). Minimum 41°F (5°C) and rising for 24 hours after application.

Relative Humidity: Maximum 85% during application and drying period.

The substrate temperature shall be 5°F (3°C) above the dew point during application.

Ventilate enclosed spaces.

COORDINATION:

Coordinate with work of other sections. Primer shall be free of any contaminants before application of fire resistive coating. Coordinate application of fire resistive coating prior to installation of ducts, equipment and other construction materials. Coordinate the installation of clips, hangers and penetrations prior to application of fire resistive coating.

PART 2 - PRODUCTSMANUFACTURERS:

The approved fire resistive coating shall be THERMO-SORB as manufactured by:

Nu-Chem, Inc.
2200 Cassens Drive
St. Louis, MO 63026
Tel: 636-349-1515 Fax: 636-349-1309
E-Mail: Info@Nu-ChemUSA.com
Web site: www.Nu-ChemUSA.com

Physical Properties:

The fire resistive coating shall be subliming/intumescent and single component.

The Spray Applied Spread Rate shall be approximately 1138 ft²/gal. @ 1 mil DFT.

The Solids by Weight shall be 74% ± 2%.

The Sprayed Density of the coating shall be approximately 81 lbs./ft³ ± 5%, as tested by ASTM D 792.

The Bond Strength of the fire resistive coating shall be a minimum of 200 psi @ RT using test method ASTM D 4541 (unnotched).

The Shore D Hardness of the coating shall be an average of 70.

Surface Burning Characteristics: ASTM E 84 Class A Rated

Flame Spread: 0

Smoke Developed: 0

The VOC of the fire resistive coating shall be 344 grams/liter (2.87 lbs/gal).

ARCHITECTURAL FINISH:

Fire Resistive Coating Finish: Coating shall have a smooth to light texture.

Topcoat Type and Color: Provide semi-gloss paint as outlined in Section 099000. Topcoat shall be compatible with fire resistive coating.

PART 3 - EXECUTIONEXAMINATION:

Verify that conditions are ready to receive work. Do not begin work until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of existing conditions.

Verify that the steel to be primed with suitable primer is free of oil, grease, loose mill scale, dirt and other substances which may impair bonding. Apply primer in strict accordance to manufacturer's written instructions. Consult fire resistive manufacturers for specific primer dry times.

Verify that clips, hangers, supports, sleeves and other items are in place prior to applying fire resistive coating.

Verify that areas to utilize fire resistive coating are accessible to receive work.

PREPARATION:

Provide protective covers to prevent overspray on surfaces not designated to receive fire resistive coating.

APPLICATION:

Mix and apply the fire resistive coating in strict accordance to the manufacturer's written instructions. Consult fire resistive coating manufacturer for specific coating application details.

Apply fire resistive coating at appropriate thickness to achieve 1 (one) hour fire rating for each size and type of structural steel listed.

Control the fire resistive coating thickness by utilizing a depth or magnetic gage.

QUALITY CONTROL:

Inspections/Testing: Owner will engage services of a testing laboratory to provide inspection and material testing.

Testing: Determine dry film thickness (DFT) of fire resistive coating for each steel member size according to AWC International Technical Manual 12-B "Standard Practice for the Testing and Inspection of Field Applied Thin – Film Intumescent Fire Resistive Materials".

Inspect fire resistive coating for integrity of the coating system. Reinspect to verify compliance prior to completion of work.

PATCHING AND REPAIR:

Remove, patch and repair non-conforming and damaged areas per manufacturer's instructions.

Leave fire resistive coating surface ready for painting per Section 099000.

CLEANING:

Clean surfaces contaminated by fire resistive coating.

End of Section 072511

SECTION 072700 - FIRESTOPPINGPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY:

This Section includes firestopping for the following:

Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.

Sealant joints in fire-resistance-rated construction.

Joints in structure which become a part of smoke barriers or fire resistive wall conditions, where structural components are discontinuous, i.e. beam to column, column or beam to wall or floor or roof tees to wall.

Related Sections: The following Sections contain requirements that relate to this Section:

Division 3 Section "Cast-In-Place Concrete" for construction of openings in concrete slabs.

Division 4 Section "Unit Masonry" for joint fillers for non-fire-resistive-rated masonry construction.

Division 7 Section "Building Insulation" for safin insulation and accessories.

Division 7 Section "Joint Sealants" for non-fire-resistive-rated joint sealants.

Division 15 Sections specifying ducts and piping penetrations.

Division 16 Sections specifying cable and conduit penetrations.

SYSTEM PERFORMANCE REQUIREMENTS:

General: Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.

F-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.

T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T ratings, in addition to F ratings, as determined per ASTM E 814, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupied floor areas. T-rated assemblies are required where the following conditions exist:

Where firestop systems protect penetrations located outside of wall cavities.

Where firestop systems protect penetrations located outside fire-resistive shaft enclosures.

Where firestop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.

Where firestop systems protect penetrating items larger than a 4-inch-diameter nominal pipe or 16 sq. in. in overall cross-sectional area.

Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, as determined per ASTM E 119, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.

For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.

For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450, as determined per ASTM E 84.

SUBMITTALS:

General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

Product data for each type of product specified.

Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

Shop drawings detailing materials, installation methods, and relationships to adjoining construction for each through-penetration firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspecting agency evidencing compliance with requirements for each condition indicated.

Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.

Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration approved by firestopping manufacturer's fire protection engineer with modifications marked.

Product certificates signed by manufacturers of firestopping products certifying that their products comply with specified requirements.

Product test reports from, and based on tests performed by, a qualified testing and inspecting agency evidencing compliance of firestopping with requirements based on comprehensive testing of current products.

Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

QUALITY ASSURANCE:

Fire-Test-Response Characteristics: Provide firestopping that complies with the following requirements and those specified under the "System Performance Requirements" article:

Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, Warnock Hersey, or another agency performing testing and follow-up inspection services for firestop systems that is acceptable to authorities having jurisdiction.

Through-penetration firestop systems are identical to those tested per ASTM E 814 under conditions where positive furnace pressure differential of at least 0.01 inch of water is maintained at a distance of 0.78 inch below the fill materials surrounding the penetrating items in the test assembly. Provide rated systems complying with the following requirements:

Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.

Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by UL in their "Fire Resistance Directory," by Warnock Hersey, or by another qualified testing and inspecting agency.

Fire-resistive joint sealant systems are identical to those tested for fire-response characteristics per ASTM E 119 under conditions where the positive furnace pressure differential is at least 0.01 inch of water, as measured 0.78 inch from the face exposed to furnace fire. Provide systems complying with the following requirements:

Fire-Resistance Ratings of Joint Sealants: As indicated by reference to design designations listed by UL in their "Fire Resistance Directory" or by another qualified testing and inspecting agency.

Joint sealants, including backing materials, bear classification marking of qualified testing and inspection agency.

Information on drawings referring to specific design designations of through-penetration firestop systems is intended to establish requirements for performance based on conditions that are expected to exist during installation. Any changes in conditions and designated systems require the Architect's prior approval. Submit documentation showing that the performance of proposed substitutions equals or exceeds that of the systems they would replace and are acceptable to authorities having jurisdiction.

Installer Qualifications: Engage an experienced Installer who has completed firestopping that is similar in material, design, and extent to that indicated for Project and that has performed successfully.

Installer Qualifications: Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

Single-Source Responsibility: Obtain through-penetration firestop systems for each kind of penetration and construction condition indicated from a single manufacturer.

Field-Constructed Mockup: Prior to installing firestopping, erect mockups for each different through-penetration firestop system indicated to verify selections made and to demonstrate qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final installations.

Locate mockups on site in locations indicated or, if not indicated, as directed by Architect.

Notify Architect 1 week in advance of the dates and times when mockups will be erected.

Obtain Architect's acceptance of mockups before start of final unit of Work.

Retain and maintain mockups during construction in an undisturbed condition as a standard for judging completed unit of Work.

When directed, demolish and remove mockups from Project site.

Accepted mockups in an undisturbed condition at time of Substantial Completion may become part of completed unit of Work.

Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."

Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.

Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

Owner will employ and pay a qualified inspection agency to check installed firestopping systems for compliance with requirements.

DELIVERY, STORAGE, AND HANDLING:

Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

PROJECT CONDITIONS:

Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

Ventilation: Ventilate firestopping per firestopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

SEQUENCING AND SCHEDULING:

Notify Owner's inspection agency at least 1 week in advance of firestopping installations; confirm dates and times on days preceding each series of installations.

Do not cover up those firestopping installations that will become concealed behind other construction until Owner's inspection agency and authorities having jurisdiction, if required, have examined each installation.

PART 2 - PRODUCTS

FIRESTOPPING, GENERAL:

Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.

Accessories: Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" article in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:

Permanent forming/damming/backing materials including the following:

Semirefractory fiber (mineral wool) insulation.

Ceramic fiber.

Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.

Fire-rated formboard.

Joint fillers for joint sealants.

Temporary forming materials.

Substrate primers.

Collars.

Steel sleeves.

Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.

FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS:

Ceramic-Fiber and Mastic Coating: Ceramic fibers in bulk form formulated for use with mastic coating, and ceramic fiber manufacturer's mastic coating.

Ceramic-Fiber Sealant: Single-component formulation of ceramic fibers and inorganic binders.

Endothermic, Latex Compound Sealant: Single-component, endothermic, latex formulation.

Intumescent, Latex Sealant: Single-component, intumescent, latex formulation.

Intumescent Putty: Nonhardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone compounds.

Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum foil on one side.

Job-Mixed Vinyl Compound: Prepackaged vinyl-based powder product for mixing with water at Project site to produce a paintable compound, passing ASTM E 136, with flame-spread and smoke-developed ratings of zero per ASTM E 84.

Mortar: Prepackaged dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogenous mortar.

Pillows/Bags: Re-usable, heat-expanding pillows/bags composed of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.

Silicone Foam: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, nonshrinking foam.

Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant of grade indicated below:

Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping/gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.

Grade for Horizontal Surfaces: Pourable (self-leveling) grade for openings in floors and other horizontal surfaces.

Grade for Vertical Surfaces: Nonsag grade for openings in vertical and other surfaces.

Solvent-Release-Curing Intumescent Sealant: Solvent-release-curing, single-component, synthetic-polymer-based sealant of grade indicated below:

Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping/gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.

Grade for Horizontal Surfaces: Pourable (self-leveling) grade for openings in floors and other horizontal surfaces.

Grade for Vertical Surfaces: Nonsag grade for openings in vertical and other surfaces.

Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Products: Subject to compliance with requirements, provide one of the following:

Endothermic, Latex Compounds:

Tremstop Intumescent Acrylic, Tremco, Inc.
Flame-Safe FS500/600 Series, W.R. Grace and Company
Flame-Safe FS900/FST900 Series, W.R. Grace and Company
LC Sealant, Specified Technologies, Inc.

Intumescent Latex Sealant:

Tremstop MP Putty Pads, Tremco, Inc.
Metacaulk 950, The RectorSeal Corporation.
Fire Barrier CP 25WB Caulk, 3M Fire Protection Products.
Flame-Safe 3000, W.R. Grace and Company
FS-One Sealant, Hilti, Inc.

Intumescent Putty:

Pensil 500 Intumescent Putty, Specified Technologies, Inc.
Flame-Safe FSP1000 Putty, W.R. Grace and Company
Fire Barrier Moldable Putty, 3M Fire Protection Products
CP617/CP617L, Hilti, Inc.

Acrylic Sealant:

Tremstop Acrylic, Tremco, Inc.
CP606, Hilti, Inc.
EC & LC, Specified Technologies, Inc.

Acrylic Spray:

Specseal Elastomeric Spray, Specified Technologies, Inc.
Tremco Acrylic Spray, Tremco, Inc.
Firedam Spray, 3M Fireproofing Products
CP 672 Speed Spray, Hilti, Inc.

Intumescent Wrap Strips:

Tremstop WS, Tremco, Inc.
Dow Corning Fire Stop Intumescent Wrap Strip 2002, Dow Corning Corp.
CP 645 Wrap Strip, Hilti, Inc.
Fire Barrier FS-195 Wrap/Strip, W.R. Grace and Company

Mortar:

Tremstop Fire Mortar, Tremco, Inc.
K-2 Firestop Mortar, Bio Fireshield, Inc.
Novasit K-10 Firestop Mortar, Bio Fireshield, Inc.
KBS-Mortar Seal, W.R. Grace and Company
FS 635, Hilti, Inc.

Pillows/Bags:

Tremstop PS, Tremco, Inc.
Firestop Pillows, Bio Fireshield, Inc.
KBS Sealbags, W.R. Grace and Company
FS 657 Fire Block, Hilti, Inc.

Silicone Sealants:

Firestop Sealant 2000, 3M Fire Protection Products
Firestop Sealant SL 2003, 3M Fire Protection Products
Pensil 100 Firestop Sealant, Specified Technologies, Inc.
CP 6015 Firestop Sealant, Hilti, Inc.
Metacaulk 835, The RectorSeal Corporation
Metacaulk 880, The RectorSeal Corporation
Fyre-Sil, Tremco, Inc.
Fyre-Sil S/L, Tremco, Inc.

Solvent-Release-Curing Intumescent Sealants:

Tremstop Intumescent Acrylic, Tremco, Inc.
Biostop 500 Intumescent Firestop Caulk, Bio Fireshield, Inc.
Fire Barrier CP 25N/S Caulk, 3M Fire Protection Products
Fire Barrier CP 25S/L Caulk, 3M Fire Protection Products

FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS:

Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.

Sealant Colors: Provide color of exposed joint sealants to comply with the following:

Provide custom colors to match Architect's samples.

Match colors indicated by reference to manufacturer's standard designations.

Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

Single-Component, Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, G, A, and (as applicable to joint substrates indicated) O.

Additional Movement Capability: Provide sealant with the capability to withstand the following percentage changes in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated:

50 percent movement in both extension and compression for a total of 100 percent movement.

100 percent movement in extension and 50 percent movement in compression for a total of 150 percent movement.

Multicomponent, Nonsag, Urethane Sealant: Type M; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.

Additional Movement Capability: Provide sealant with the capability to withstand the following percentage change in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated:

40 percent movement in extension and 25 percent in compression for a total of 65 percent movement.

50 percent movement in both extension and compression for a total of 100 percent movement.

Single-Component, Nonsag, Urethane Sealant: Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O.

Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Products: Subject to compliance with requirements, provide one of the following:

Single-Component, Neutral-Curing, Silicone Sealant:

Spectrem 1, Tremco, Inc.

Spectrem 2, Tremco, Inc.

Spectrem 3, Tremco, Inc.

Silpruf, General Electric Co.

Ultraglaze, General Electric Co.

864, Pecora Corp.

Multicomponent, Nonsag, Urethane Sealant:

Vulkem 922, Tremco, Inc.
Dynflex, Pecora Corp.
Dynatred, Pecora Corp.
Dynatrol II, Pecora Corp.
Sikaflex 2cn NS, Sika Corp.
Sonolastic NP 2, Sonneborn Building Products Div., ChemRex, Inc.
Dymeric, Tremco, Inc.

Single-Component, Nonsag, Urethane Sealant:

Isoflex 880 GB, Harry S. Peterson Co., Inc.
Isoflex 881, Harry S. Peterson Co., Inc.
Vulkem 921, Tremco, Inc.
Sikaflex--15LM, Sika Corp.

MIXING:

For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTIONEXAMINATION:

Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

PREPARATION:

Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:

Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.

Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.

Remove laitance and form release agents from concrete.

Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing firestopping's seal with substrates.

INSTALLING THROUGH-PENETRATION FIRESTOPS:

General: Comply with the "System Performance Requirements" article in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.

Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross-sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:

Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.

Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

INSTALLING FIRE-RESISTIVE JOINT SEALANTS:

General: Comply with the "System Performance Requirements" article in Part 1, with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.

Install joint fillers to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.

Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.

Tool nonsag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire-resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

FIELD QUALITY CONTROL:

Inspecting agency employed and paid by Owner will examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.

Inspecting agency will report observations promptly and in writing to Contractor and Architect.

Do not proceed to enclose firestopping with other construction until reports of examinations are issued.

Where deficiencies are found, repair or replace firestopping so that it complies with requirements.

CLEANING:

Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.

Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to produce firestopping complying with specified requirements.

End of Section 072700

SECTION 074100 - METAL WALL PANELSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of wall panel installation is indicated on the drawings and by provisions of this section.

Field Measurements: Where possible, prior to fabrication of prefabricated panels, take field measurements of structure or substrates to receive panel system. Allow for trimming panel units where final dimensions cannot be established prior to fabrication.

Related Sections:

Division 4, Masonry
Division 5, Metal Decking
Division 6, Rough Carpentry
Division 7, Flashing and Sheetmetal, Roof Insulation, Joint Sealers.

QUALITY ASSURANCE:

Panel installer shall have a minimum ten (10) years of experience in manufacturing metal wall panels.

Panel installer shall have a minimum two (2) years experience in the installation of metal wall panels, having successfully completed at least three (3) projects of similar size, scope and complexity.

Panel Installer shall be an approved installer, certified by the manufacturer for installation of the manufacturer's wall panels.

WARRANTY:

Panel manufacturer shall provide a twenty (20) year warranty on the paint finish covering chalking, cracking, checking, chipping, blistering, peeling, flaking and fading.

Installer shall furnish written warranty for a two (2) year period from date of substantial completion of building covering repairs required to maintain wall panels and flashings in watertight conditions.

SUBMITTALS:

Product Data: Submit manufacturer's product specifications, standard details, certified product test results, installation instructions and general recommendations, as applicable to materials and finishes for each component and for total system of preformed panels.

Samples: Submit 2 samples 12" square, of each exposed finish material.

Shop Drawings: Complete shop drawings shall be provided by the manufacturer only. Submit small-scale layouts of panels, and large-scale details of edge conditions, joints, corners, custom profiles, supports, anchorages, trim, flashing, closures, and special details. Distinguish between factory and field assembly work. All panel fabrication shall be by manufacturer in manufacturer's factory.

DELIVERY, STORAGE, AND HANDLING:

Wall panels shall be protected and properly packaged to protect against transportation damage in transit to the jobsite.

Upon delivery, exercise care in unloading, stacking, moving, storing, and erecting panels to prevent twisting, bending, scratching or denting.

Store panels in a safe dry environment under a waterproof covering, to prevent water damage and allow adequate ventilation to prevent condensation. Wall panels with strippable film shall not be stored in direct sunlight.

Upon installation, immediately remove strippable film from panels and related trim. Protect panels from foot traffic when being stored and from all other trades.

PART 2 - PRODUCTSMATERIALS:WALL PANELS:

Wall Panels shall be 12" wide, 1-1½" high flush panels, as manufactured by AEP, with two pencil ribs the entire length of the panel. Panel thickness shall be no less than 22 gage. G-90 galvanized steel with Kynar 500 finish.

Installation Tolerances: Shim and align panel units within installed tolerance of 1/4 inch in 20 feet on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

All flashing and trim, transition rib covers at changes in roof direction, gutters and downspouts for roof and wall panels shall be of the same material, gauge, finish and color as the roof panels and fabricated in accordance with Standard SMACNA Procedures and Details.

Color: Custom color to match existing adjacent wall panels on existing building.

Installation Tolerances: Shim and align panel units within installed tolerance of ¼ inch in 20 feet (6 mm in 6 m) on level, plumb, and location lines as indicated and within ⅛-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

All flashing and trim, transition rib covers at changes in roof direction, gutters and downspouts for roof and wall panels shall be of the same material, gauge, finish and color as the roof panels and fabricated in accordance with Standard SMACNA Procedures and Details.

Coordination: Contractor shall verify and match wall panel profile and color of wall panels on existing adjacent building.

ACCEPTABLE MANUFACTURERS:

Wall Panels:

AEP-Span.
Berridge Manufacturing Co.
IMETCO
MBCI
McElroy Metal, Inc.
Peterson Aluminum Corporation
Firestone
Englert

METAL FINISHES:

General: Apply coatings either before or after forming and fabricating panels, as required by coating process and as required for maximum coating performance capability. Protect coating either by application of strippable film or by packing plastic film or other suitable material between panels in a manner to properly protect the finish. Furnish air-drying spray finish in matching color for touch-up.

Color: Custom color to match existing adjacent wall panels on existing building.

Fluoropolymer Coating: Manufacturer's standard two-coat, thermo-cured, full-strength 70 percent "Kynar 500" coating consisting of a minimum 0.2 mil primer and a minimum 0.8-mil dry film thickness finish coat with a total minimum dry film thickness of 1.0 mil +/- 0.2 mil and 30 percent reflective gloss when tested in accordance with ASTM D 523.

Durability: Provide coating that has been field tested under normal range of weathering conditions for minimum of 20 years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of No. 8 in accordance with ASTM D 659; and without fading in excess of 5 NBS units.

Accessories: Except as indicated as work of another specification section, provide components required for a complete wall system, including corner units, ridge closures, clips, sealants, gaskets, filler, closure strips and similar items. Match materials/finishes of preformed panels.

Fasteners:

Clips to substrate: Screw shall be #12, low profile pancake head self tapping type, zinc plated steel.

Trim to panels: Exposed screws shall be zinc plated with 5/8 diameter combination steel and neoprene washer, color to match panel.

Pop Rivets: #43 stainless steel, color finish to match panel.

Top Closure Strips: Provide formed closure strips to conform to seam spacing at point of closure. Strip shall be "Z" shape with end tabs to contact seams at each end. Cut to match configuration of wall panels. Provide closure strips where indicated or necessary to ensure weathertight construction. All contact with closure and panels or flashing shall be set in tape sealant.

Sealing Tape: Pressure-sensitive 100 percent solids polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

Joint Sealant: One-part elastomeric polyurethane, polysulfide, or silicone rubber sealant as recommended by the building manufacturer.

Bituminous Coating: Cold-applied asphalt mastic, SSPC paint 12, compounded for 15 mil dry film thickness per coat.

PANEL FABRICATION; PERFORMANCES:

General: Fabricate and finish panels and accessories at the factory by manufacturer's standard procedures and processes.

Face Sheets: Fabricate wall panel face sheets to the profile or configuration indicated from 24 gage, G90 galvanized smooth steel sheets.

PART 3 - EXECUTIONINSTALLATION:

General: Comply with panel fabricator's and material manufacturer's instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the work securely in place, with provisions for thermal/structural movement.

Coat the backside of wall panels with bituminous coating wherever it will be in contact with wood, ferrous metal or cementitious construction.

General: Comply with manufacturers' instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the work securely in place, with provisions for thermal and structural movement.

Field cutting of exterior panels by torch is not permitted.

Panels shall be removable for replacement during and after installation is completed.

Standard straight panels shall have a factory formed interlock.

Accessories: Install components required for a complete wall panel system, including trim, copings, fascias, gravel stops, mullions, sills, corner units, ridge closures, clips, seam covers, battens, flashings, gutters, louvers, sealants, gaskets, fillers, closure strips and similar items.

Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of panel systems. Provide types of gaskets, sealants, and fillers indicated or, if not otherwise indicated, types recommended by panel manufacturer.

Refer to other sections of these specifications for product and installation requirements applicable to indicated joint sealers.

Joint Sealers: Refer to other sections of these specifications for post-installation requirements on joint sealers; not work of this section.

CLEANING AND PROTECTION:

Damaged Units: Replace panels and other components of the work which have been damaged or have deteriorated beyond successful repair by means of finish touch-up or similar minor repair procedures.

Cleaning: Remove temporary protective coverings and strippable films (if any) as each panel is installed. Upon completion of panel installation, clean finished surfaces as recommended by panel manufacturer, and maintain in a clean condition during construction.

General Contractor shall provide for protection of installed wall panels from damage by other trades.

End of Section 074100

SECTION 075150 - BUILT-UP ROOFING SYSTEMPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of built-up asphalt roofing system work is indicated on drawings and by provisions of this section, and is defined to include roofing, composition flashing and stripping, and roofing accessories integrally related to roof installation.

Note: this section is provided for use at areas where existing Built-up roof must be penetrated or interfaced with curbs for new TPO membranes.

Roof insulation is specified in Section 079020, Roof Insulation.

Wood Nailers/Curbs/Cants are specified in a Division-6 section of this specification; not work of this section.

Metal counter flashings are specified in Section 076000, "Flashing and Sheet Metal".

QUALITY ASSURANCE:Pre-Roofing Conference:

Pre-Roofing Conference shall be conducted for EACH TYPE OF ROOFING AT EACH PHASE OF THE PROJECT IN ACCORDANCE WITH SECTION 079010 - ROOFING SYSTEMS - GENERAL.

All roofs shall receive built-up roofing complying with Underwriter's Laboratories Class "A" requirements.

Qualifications of Applicator: Applicator shall be one who can furnish an affidavit from the roofing materials manufacturers certifying that the applicator has satisfactorily applied the type of roof specified on projects of similar scope and complexity which have been complete for at least five (5) years.

Applicator's Field Supervision: Applicator must maintain full-time supervisor/foreman on job site during times that roofing work is in progress. Supervisor must have minimum of 5 years experience in roofing work similar to nature and scope to specified roofing.

SUBMITTALS:

Product Data: Submit manufacturer's technical product data, installation instructions and recommendations for each type of roofing product required. Include data substantiating that materials comply with requirements.

JOB CONDITIONS:

Weather Condition Limitations: Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.

PRODUCT HANDLING:

Store and handle roofing sheets in a manner which will ensure that there is no possibility of significant moisture pick-up. Store in a dry, well ventilated, weather-tight place. Unless protected from weather or other moisture sources, do not leave unused felts on the roof overnight or when roofing work is not in progress. Store rolls of felt and other sheet materials on end on pallets or other raised surface. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck.

GUARANTEE:

Roofing and its incidental sheet metal work specified herein shall be guaranteed for five (5) years in compliance with Master Roofing and Sheet Metal Contractors Association of Atlanta, Inc. A written 5 year guarantee covering both materials and workmanship shall be provided by the roofing contractor.

Guarantee shall be provided to the Owner before final payment is made.

TESTING:

The Owner will retain a full time inspection service for testing of all roofing during construction.

Refer to the General Conditions, (GCPS - General Conditions, Revision VIII, dated 08/30/13). The Owner will have test cuts taken and laboratory tests performed on any areas of roofing to be done by this contract. If the roofing is satisfactory, all costs of cuts, samples, laboratory work and patching shall be borne by the Owner. In the event that tests reveal workmanship or materials that do not meet the requirements of the specifications, all costs of the testing, removal of the unsatisfactory roofing and the replacement thereof shall be borne by the Contractor.

Owner's roofing Consultant will judge the installation based on the manufacturer's requirements for a 20-year ND, non prorated roof warranty

PART 2 - PRODUCTS

The only roofing systems the Owner will accept are those having a bonafide manufacturer's representative permanently located within the metropolitan Atlanta area. All roofing shall be of premium plies.

All material and installation shall comply with the manufacturer's requirements to receive a 20 year NDL roof bond, the standard by which the Owner's Roof Inspection Service will judge the installation.

Roofing: Roofing shall be in strict accordance with the specifications listed after the manufacturer, utilize premium felts.

Built-up Roofing On Insulation On Metal Deck:

1. Certaineed, Glass and Asphalt Ply Sheet Membrane System, Gravel Surface, Specification No. G-C-B4, (non-nailable) (four ply system).
2. Johns Manville, four ply Gravel Surface Glasply Premium, Fiber Glass Built-Up Roof, Specification No. 4GIG.
3. GAF, four ply Fiberglas Gravel Surface Built-Up Roof Specification No. I-O-4-G
4. Firestone, four ply Fiberglass, gravel surface built-up roof, Specification No. 1-4F-G.

Base Flashing: This shall be of the same manufacturer as roofing materials; approved systems as follows:

1. Certaineed, Flintlastic
2. Johns Manville FE-1, FE-3.
3. Gafglas Rubberoid MB Membrane.
4. Firestone SBS Flashing.

Roof Expansion Joints: Expansion Joints shall be formed metal construction, as shown on drawings.

PART 3 - EXECUTION

INSPECTION OF SUBSTRATE:

Examine substrate surfaces to receive built-up roofing system and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

Verify that flatness and fastening of metal roof decks comply with the following:

Top Flanges: No concavity or convexity in excess of 1/16 inch across any three adjacent flanges.

Side Laps: Properly nested and mechanically fastened at a maximum spacing of 18" min. o.c.

End Laps: Minimum 2-inch laps located over and fastened to supports.

Deck secured to each supporting member in every other rib, maximum spacing 12 inches o.c., with puddle welds or approved mechanical fasteners.

GENERAL INSTALLATION REQUIREMENTS:

Protect other work from spillage of built-up roofing materials, and prevent liquid materials from entering or clogging drains and conductors. Replace/restore other work damaged by installation of built-up roofing system work.

Roof Accessories: Miscellaneous sheet metal accessory items, including insulation vents and other devices, and major items of roof accessories to be coordinated with built-up roofing system work, are specified in other sections of these specifications.

Install weather resistant pressure sensitive tape joint reinforcement over composite panel joints where built-up roofing occurs over composite cementitious deck.

Roof Drains: Fill clamping ring base with a heavy coating of roofing cement. Set 30" x 30" lead flashing sheet in a full bed of roofing cement on completed built-up roofing ply sheet courses, with lead sheet clamped in roof drain ring and extended 12" onto roofing. Cover lead sheet with composition stripping, with plies extended minimum 6" beyond edges of lead sheet on first ply and 6" past edge of first ply with 2nd ply. Provide composition stripping of gravel stop rings (if any).

Install composition stripping where metal flanges are set on roofing. Provide not less than one ply of glass-fiber fabric and one ply of reinforced glass-fiber flashing; set each in a continuous coating of roofing cement and extended onto the deck 4 inches and 6 inches, respectively. Except where concealed by aggregate surfacing or elastic flashing, apply a heavy coating of roofing cement over composition stripping.

PROTECTION OF ROOFING:

Upon completion of roofing work (including associated work) Installer shall advise Contractor of recommended procedures for surveillance and protection of roofing during remainder of construction period.

At the end of construction period, or at a time when remaining construction work will in no way affect or endanger roofing (at Contractor's option), Installer shall make a final inspection of roofing and prepare a written report (to Contractor's with copy to Owner) describing nature and extent of deterioration or damage found in the work.

End of Section 075150

Mechanically Attached Thermoplastic Olefin (TPO) Single Ply Roofing SystemSECTION 075400 - MECHANICALLY ATTACHED THERMOPLASTIC OLEFIN (TPO) SINGLE PLY ROOFING SYSTEMPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

WORK INCLUDED:

Work under this section covers the installation of a new Mechanically Attached TPO roofing system on a Gwinnett County School System K-12 building, Gwinnett County, GA. In addition, contractor shall include all related items of work as noted herein or indicated on the drawings or otherwise required to complete the specified elements of work and provide the necessary warranties for this work.

SECTION INCLUDES:

- Substrate preparation.
- Wood nailer installation.
- Membrane installation.
- Membrane flashing installation.

RELATED SECTIONS:

- Section 020700 - Selective Demolition.
- Section 061000 - Rough Carpentry.
- Section 079020 - Roof Insulation.
- Section 076000 - Sheet Metal, Flashing and Trim.
- Section 077000 - Roofing Specialties and Accessories.
- Section 079000 - Joint Sealers.

SYSTEM DESCRIPTION:

TPO .060 membrane mechanically fastened over coverboard, over isocyanurate insulation secured to metal deck.

SUBMITTALS:

Product Data: Submit copies of manufacturer's Technical Information Sheets (TIS) for primary products used including roof membrane, splice tape, fasteners, and batten strip.

Mechanically Attached Thermoplastic Olefin (TPO) Single Ply Roofing System

Samples: Submit samples of roof membrane, copy of manufacturer's application specification, copy of job related manufacturer's details including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, drains, and any other relevant details.

Letter attesting that manufacturer currently licenses roofing contractor.

QUALITY ASSURANCE:Pre-Roofing Conference:

Pre-Roofing Conference shall be conducted for EACH TYPE OF ROOFING AT EACH PHASE OF THE PROJECT IN ACCORDANCE WITH SECTION 079010 - ROOFING SYSTEMS - GENERAL.

All roofs shall receive built-up roofing complying with Underwriter's Laboratories Class "A" requirements.

Qualifications of Applicator: Applicator shall be one who can furnish an affidavit from the roofing materials manufacturers certifying that the applicator has satisfactorily applied the type of roof specified on projects of similar scope and complexity which have been complete for at least five (5) years.

Applicator's Field Supervision: Applicator must maintain full-time supervisor/foreman on job site during times that roofing work is in progress. Supervisor must have minimum of 5 years experience in roofing work similar to nature and scope to specified roofing.

Preceding job start up, contractor shall decide to his satisfaction that all specifications contained herein are workable. Contractor shall perform all work by competent, trained, and properly equipped personnel in strict accordance with good roofing practices and applicable industry standards. Contractor shall follow application, safety, etc. information as published in the most current edition of the manufacturer's TPO Roofing System Technical Specification.

QUALIFICATIONS:Manufacturer:

System supplier shall have ISO 9002 certification.

Manufacturer must be able to provide the project with the Isocyanurate insulation that it produces in their facilities.

Applicator:

Shall be a manufacturer's approved Contractor.

Shall have at least five years experience in installing heat welded systems.

REGULATORY REQUIREMENTS:

Conform to applicable local building code requirements using ASCE7-10 for the following criteria of:

East Addition to North Gwinnett High School, Gwinnett County, GA

SHL-D01-21

Mechanically Attached Thermoplastic Olefin (TPO) Single Ply Roofing System

Wind Design Speed: 115 MPH

Exposure Rating: C

Building Category: II

Enclosure Rating: Enclosed

Underwriters Laboratories, Inc. (UL): Class A Fire Hazard Classification.

All edge securement systems shall be installed in accordance with ANSI/SPRI ES-1.

QUALITY INSPECTION/OBSERVATION:

Inspection by Manufacturer: Provide a final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer. Technical representative shall not perform any sales functions. Contractor shall complete any necessary repairs required for issuance of warranty.

DELIVERY, STORAGE AND HANDLING:

Deliver products in manufacturer's original containers dry, undamaged, seals and labels intact and legible. Store all materials clear of ground and moisture with weather protective covering. Keep all combustible materials away from ALL ignition sources.

Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition. Consult container labels and material Safety Data Sheets (MSDS) for specific safety instructions. Deliver materials to job site in their original containers as labeled by the manufacturer.

ENVIRONMENTAL REQUIREMENTS:

Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice. Do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application. Consult Manufacturer's Technical Specifications on cold weather application.

GUARANTEE:

Roofing incidental sheet metal work specified herein shall be guaranteed for five (5) years in compliance with Master Roofing and Sheet Metal Contractors Association of Atlanta, Inc. A written 5 year guarantee covering both materials and workmanship shall be provided by the roofing contractor.

Guarantee shall be provided to the Owner before final payment is made.

TESTING/OBSERVATION:

The Owner will retain a full time inspection service for testing of all roofing during construction.

Mechanically Attached Thermoplastic Olefin (TPO) Single Ply Roofing System

Refer to the General Conditions, (GCPS - General Conditions, Revision VIII, dated 08/30/13). The Owner will have test cuts taken and laboratory tests performed on any areas of roofing to be done by this contract. If the roofing is satisfactory, all costs of cuts, samples, laboratory work and patching shall be borne by the Owner. In the event that tests reveal workmanship or materials that do not meet the requirements of the specifications, all costs of the testing, removal of the unsatisfactory roofing and the replacement thereof shall be borne by the Contractor.

Owner's roofing Consultant will judge the installation based on the manufacturer's requirements for a 20-year NDL, non prorated roof warranty

PART 2 - PRODUCTSMANUFACTURERS:

Carlisle Syntec: Sure-Weld, 60 mil.

Johns Manville: JM TPO, 60 mil.

Firestone: UltraPly TPO, 60 mil.

TPO SHEET ROOFING AND FLASHING MEMBRANE:

Description: Reinforced, TPO synthetic single-ply membrane.

Membrane Type: .060 Reinforced TPO

Color: White

Membrane: Manufactures standard sheet capable of withstanding reflective light and high heat.

ROOF INSULATION COMPONENTS:

BASE LAYER: Polyisocyanurate Insulation: Roof insulation consisting of closed cell polyisocyanurate foam core and a perforated black glass reinforced mat laminated to the face. Minimum thickness 4".

TOP LAYER: Cover Board: High density, closed cell polyisocyanurate foam core with a coated glass facer. Minimum Nominal thickness: 1/2"

TPO SHEET ROOFING SYSTEM COMPONENTS:

Roof Membrane: .060 TPO membrane.

TPO unsupported Flashing: Non-reinforced, TPO, single-ply flashing composed of Thermoplastic Polyolefin polymer, and Ethylene Propylene Rubber; Nominal Thickness: .060 inch.

TPO Bonding Adhesive: Butyl-based, formulated for compatibility with the TPO membrane and a wide variety of substrate materials, including masonry, wood, insulation facings.

Pourable Sealer: 2-Part urethane, 2-color reliable mixing.

Mechanically Attached Thermoplastic Olefin (TPO) Single Ply Roofing System

Seam Plates: Steel with barbs and a Galvalume coating. Reference Standard: Corrosion-resistant to meet FM-4470 criteria.

Termination Bar: 1.3" x 0.10" thick aluminum bar with integral caulk ledge.

Membrane Fasteners:

TPO Cut Edge Sealant: Manufacturer's recommended Polymeric sealant for use where exposed reinforcement is encountered.

TPO General Purpose Sealant: Manufacturer's Polymeric one part general purpose sealant.

TPO Coated Metal: Galvanized Steel with Manufacturers bonded TPO Coating.

TPO Molded Flashing Accessories:

TPO membrane Pre-Molded for a variety of flashing details: Pipe Boots, Inside-Outside corners, etc.

MISCELLANEOUS:

Roof Walkway Pads: Description: Non-reinforced manufacturer's TPO Walkway Pads, .130" x 30" x 50' with Patterned traffic bearing surface.

TPO Molded inside corners
TPO Molded outside corners
TPO Molded pipe boots
TPO T-Joint Covers

PART 3 - EXECUTION

EXAMINATION:

Examine roof deck to determine that it is sufficiently rigid to support roofers and their mechanical equipment and that deflection will no strain or rupture roof components or deform deck. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work. Examine roof substrate to verify that it is properly sloped for drainage.

Start work with sealants and adhesives only at 60 - 80 F.

Fumes from adhesive solvents may be drawn into the building during installation through rooftop intakes. Appropriate measures must be taken to assure that fumes from adhesive solvents are not drawn into the building through air intakes.

Mechanically Attached Thermoplastic Olefin (TPO) Single Ply Roofing SystemRe-Roofing: TPO over Existing B-U, Gravel Surfaced Roof:

For re-roofing applications only: remove existing roof system components as specified. The surface must be clean, dry, smooth, free of sharp edges, fins, loose or foreign materials, oil, grease and other materials that may damage the membrane, All roughened surfaces, which could cause damage, shall be properly repaired before proceeding. All surface voids of the immediate substrate greater than 1/4" wide must be properly filled with an acceptable insulation or suitable fill material.

Power vacuum loose gravel from the roof surface. Remove all metal flashings and copings, membrane flashings, pipe flashings and cant strips. Install 1/2"p.t. plywood over parapet walls where membrane flashings were removed. Spud asphalt protrusions and high places to obtain an even roof surface. Mechanically fasten 1/2" high density Iso insulation over the existing roof to the metal deck. Mechanically fasten new minimum 60-mil TPO membrane per manufacturer requirements to obtain the specified warranty.

PROTECTION OF OTHER WORK:

Protect metal, glass, plastic, and painted surfaces from adhesives and sealants. Protect neighboring work, property, cars, and persons from spills and overspray from adhesives, sealants and coatings and from damage related to roofing work. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trade.

WOOD NAILER LOCATION AND INSTALLATION:

Total wood nailer height shall match the total thickness of insulation being used and shall be installed with a 1/8" gap between each length and at each change of direction. Wood nailers shall be firmly fastened to the deck. Mechanically fasten wood nailers.

VAPOR RETARDER:

None

MEMBRANE PLACEMENT AND ATTACHMENT:

Starting at the low point of the roof, place the membrane panels without stretching over the acceptable substrate. Position subsequent membrane sheets in the same manner, overlapping the ends of adjoining sheets a minimum of 3" and side laps a minimum of 6". Install panels to insure that laps shed water.

Where TPO Membrane has been cut to expose reinforcing membrane, Manufacturer's recommended TPO Cut Edge Sealant or TPO General Purpose Sealant must be used to encapsulate exposed edge.

Install each fastener so that it is properly engaged in the deck and not overdriven.

Layout perimeter attachment in the pattern designated by the project designer, and to comply with manufacturer's minimum requirements. Install the seam plates using manufacturer's HD fasteners.

Mechanically Attached Thermoplastic Olefin (TPO) Single Ply Roofing SystemMEMBRANE LAP SPLICING:

Lap splice areas that have been contaminated must be wiped down with a dry or damp (water only) clean cloth prior to heat welding and allow to completely dry. All field and flashing splices on the horizontal surface shall be completed using an automatic heat welder that has been designed for hot air welding of thermoplastic Olefin membranes. Hand held welders are only to be used on vertical welds or where an automatic welder is not practical or cannot be used. All field seams must be Singleweld and shall be made with the automatic welder with a minimum of 1 ½" wide seam.

Seams (wall, flashing, etc...) made with hand welders shall be a minimum of 2" wide. Use 2" side silicone or silicone coated steel hand rollers to assure proper mating of surfaces as hand heat welding proceeds. Probe all completed welds using a slotted screwdriver or cotter pin puller type tool to verify seam integrity. Do not probe welds until they have had time to cool to ambient conditions. Any welds found to be insufficiently welded need to be repaired on a daily basis.

MEMBRANE SECUREMENT:

Secure membrane at all locations where the membrane terminates or goes through an angle change greater than 1" in 12" except for round pipe penetrations less than 18" in diameter and square penetrations less than 4" square.

Mechanically fasten Firestone polymer or metal seam battens with Manufacturer's recommended Fasteners in accordance with manufacturer's recommended details. Install Manufacturer's membrane as flashing.

FLASHING - PENETRATIONS:General:

If project is retrofit or Tear-Off remove all existing flashings (i.e., lead, asphalt, mastic, etc.).

Flash all penetrations passing through the membrane. The flashing seal must be made directly to the penetration (pipes, round supports, etc.):

Flash with manufacturer's Pre-Molded TPO Pipe Flashings where practical.

Flash using manufacturer's recommended TPO unsupported Flashing membrane when Pre-Molded Flashing is not practical.

Structural Steel Tubing: Use a field fabricated pipe-flashing detail provided that the minimum corner radius is greater than 1/4" and the longest side of the tube does not exceed 12". When the tube exceeds 12: use a standard curb detail.

Roof Drains: If project is Retrofit or Tear-Off remove all existing flashings, drain leads, roofing materials and cement from the existing drain in preparation for membrane Water Block Seal. Provide a clean even finish on the mating surfaces between the clamping ring and the drain bowl.

Mechanically Attached Thermoplastic Olefin (TPO) Single Ply Roofing System

Taper insulation around the drain to provide a smooth transition from the roof surface to the drain. Use pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope. Slope shall not exceed manufacturer's recommendations. Position the TPO membrane, then cut a hole for the food drain to allow 1/2" - 3/4" of membrane extending inside the clamping ring past the drain bolts. Make round holes in the TPO membrane to align with clamping bolts. Do not cut the membrane back to the bolt holes. Place Water Block Seal on top of drain bowl where the clamping ring seats below membrane. Install the roof drain clamping ring and clamping bolts. Tighten the clamping bolts to achieve constant compression.

Pipe Clusters and Unusual Shaped Penetrations: Provide roof penetration curb(s).

Hot Pipes: Protect the TPO components from direct contact with steam or heat sources when the in-service temperature is in excess of 140 F. In all such cases flash to an intermediate insulated "cool" sleeve per manufacturer's details.

Expansion Joints: Install as shown on roof drawings in accordance with manufacturer's details.

FLASHING - WALLS, PARAPETS, MECHANICAL EQUIPMENT, CURBS:

General: Using the longest pieces practical, flash all walls, parapets, curbs, etc., a minimum of 8" high per manufacturer's details. Evaluate the substrate and overlay per manufacturer's specifications as necessary. If project is Retrofit or Tear-Off remove all flashings. Remove excessive asphalt to provide a smooth, sound surface for new flashings. Apply TPO Bonding Adhesive at about the same time to both the membrane flashing and the surface to which it is being bonded so as to allow approximately the same drying time. Apply Bonding Adhesive by rolling the adhesive on to the mating surfaces evenly, avoiding globs or puddles. Allow TPO Bonding Adhesive to flash off until tacky. Touch the Bonding Adhesive surface with a clean, dry finger to be certain that the adhesive does not stick or string. As you are touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, then it is not ready for mating. Flash off time will vary depending on ambient air conditions.

Roll the flashing into the adhesive evenly and carefully so as to minimize wrinkles. To ensure proper contact, compress the flashing to the substrate with a stiff push broom. Complete the splice between membrane flashing and the main roof sheet by hot air welding. Provide lap splices in accordance with manufacturer's details.

Provide termination directly to the vertical substrate as shown in manufacturer's details.

Install TPO T-Joint covers at field and flashing splice intersections as required by manufacturer.

Install intermediate flashing attachment as required by manufacturer's specifications and details.

FLASHING - GRAVEL STOPS OR ROOF EDGE METALS:

Flash all gravel stops or roof edges as outlined in manufacturer's details.

Mechanically Attached Thermoplastic Olefin (TPO) Single Ply Roofing SystemTEMPORARY CLOSURE:

Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the roofing contractor. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.

ROOF WALKWAYS:

Walkways shall consist of manufacturer's TPO Walkway material. Heat weld the perimeters of the walkway material to the TPO membrane per manufacturer's specifications.

CLEAN-UP:

Clean all contaminants from building and surrounding areas. Remove trash, debris, equipment from project site and surrounding areas. Repair or replace damaged building components or surrounding areas to the satisfaction of the Architect and Owner.

Contractor shall dispose of all waste materials properly.

End of Section 075400

SECTION 076000 - FLASHING AND SHEET METALPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

The extent of each type of flashing and sheet metal work is indicated on the drawings and by provisions of this section.

The types of work specified in this section include the following:

Gutters and downspouts (rain drainage), copings, roof expansion joint covers.

Miscellaneous sheet metal accessories.

Roofing accessories (excluding roof accessories) are specified in roofing system sections as roofing work.

QUALITY ASSURANCE:

Metal edge anchorage shall comply with section 1507 of The International Building Code (2012 Edition with Georgia State Amendments, 2014).

SUBMITTALS:

Product Data; Flashing, Sheet Metal, Accessories: Submit manufacturer's product specifications, installation instructions and general recommendations for each specified sheet material and fabricated product.

Shop Drawings; Flashing, Sheet Metal, Accessories: Submit shop drawings showing layout, joining, profiles, and anchorages of fabricated work, including gutters, downspouts; layouts at 1/4" scale, details at 3" scale.

JOB CONDITIONS:

Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of the work and protect of materials and finishes.

PART 2 - PRODUCTSFLASHING AND SHEET METAL MATERIALS:Sheet Metal Flashing/Trim:

Weights and Types: The gauges for the following items are minimum.

Exposed Flashing:

Gravel Stops, Gutters, Downspouts, Flashings: Galvalume gauge as noted on the drawings. Where not otherwise noted, minimum gauge shall be 24 gauge.

Cleats for gravel stops and eave fascia shall be continuous, 18 gage galvanized metal.

Finish: Exposed sheet metal items shall have pre-finished coating Kynar 500, (min. Kynar coating 0.70 to 0.90); custom color to match metal roof color.

Copings:

Shall be W. P. Hickman Company Lock Coping Systems. 0.50 prefinished. Slope as shown on drawings. Finish to be Kynar 500 (min. Kynar coating 0.70 to 0.90). Cleats for copings shall be continuous.

Acceptable Manufacturers: Peterson Aluminum Corp., W. P. Hickman Company, Cheney Flashing Company, Architectural Products Company, Metal-ERA Roof Edge Systems.

Miscellaneous Materials and Accessories:

Ice and Water Shield, 40 Mil thick shall be used at all eaves, copings, expansion joints and roof dividers. All references to "Plastic Flashing" in roof condition details shall mean. Ice and Water Underlayment: W. R. Grace Ice and Water Shield; Atlas Storm Master DG Ice & Water Protection; GAF Stormguard Waterproof Underlayment; Owens Corning Weatherlock; or Johns-Manville Ice and Water Guard.

Fasteners: Same metal as flashing/sheet metal or, other noncorrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

Bituminous Coating: FS TT-C-494 or SSPC - Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.

Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, nondrying, non-migrating sealant.

Epoxy Seam Sealer: 2-part non-corrosive metal seam cementing compound, recommended by manufacturer for exterior/interior nonmoving joints including riveted joints.

Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gauge required for performance.

FABRICATED UNITS:

General Metal Fabrication:

Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels as indicated, with exposed edges folded back to form hems.

Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges to be seamed, form seams, and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.

Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1" deep, filled with mastic sealant (concealed within joints).

Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with industry standards.

Separations: Provide for separation of metal from noncompatible metal or corrosive substrates using 20 mil plastic. At roof edges plastic shall extend onto roof minimum of 12" and down wall and behind gutter to bottom of gutter fascia and to bottom of gutter.

PART 3 - EXECUTION

INSTALLATION REQUIREMENTS:

General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.

Set metal gravel stops in a full bed of roofing cement. Install all plastic flashings in a full bed of roofing cement.

Provide butt and splice joints with cover plate in gravel stop/fascia.

Underlayment: Where aluminum is to be installed directly on cementitious or wood substrates, install a course of paper slip sheet and a course of polyethylene underlayment.

Set copings over 40 mil thickness ice and water shield membrane, secured under continuous front and back coping cleats, trimmed even with bottom edge of cleats, and sealed at laps using manufacturer's recommended adhesive. Secure copings with front and back continuous cleats only; do not penetrate coping with mechanical anchor.

Edge securement shall comply with ANSI/SPRI ES-1, with wind speed determined from figure 1609 of the International Building Code (2012 Edition, with Georgia State Amendments, 2014).

Contractor: Do not allow trades mounting equipment to penetrate top side of copings or counter flashings with fasteners.

All fastening shall be through vertical sides of counter flashings or copings.

Coordinate downspout underground collector to fit tight to building face and downspout boot to cover top of collector pipe.

CLEANING AND PROTECTION:

Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.

Protection: Installer shall advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction, to ensure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

End of Section 076000

SECTION 077000 - ROOF ACCESSORIESPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent and locations of roof accessories is indicated on the drawings and by provisions of this section.

Types of units specified in this section include the following:

- Prefabricated pipe curb units.
- Prefabricated curb-set roof expansion joints.

Refer to roofing system and mechanical sections of these specifications for roofing accessories to be built into roofing system.

Curbs for HVAC equipment supports is specified under mechanical sections.

SUBMITTALS:

Product Data; Roof Accessories: Submit manufacturer's technical product data, rough-in diagrams, details, installation instructions and general product recommendations.

PART 2 - PRODUCTSGENERAL PRODUCT REQUIREMENTS:

Provide manufacturers' standard units, modified as necessary to comply with requirements. Shop fabricate each unit to greatest extent possible.

PREFABRICATED CURBS FOR EXPANSION JOINTS:

Pate Mfg. Co expansion joint style ej 2. **DO NOT PROVIDE SLOPING END SECTIONS. ENDS SHALL BE SQUARE.** Do not use curbs with built-in cants, use straight curbs only.

Manufacturer: Subject to compliance with requirements, provide prefabricated equipment supports by one of the following:

Custom Curb, Inc.; Chattanooga, TN
The Pate Company; Broadview, IL
ThyCurb Div./ThyBar Corp.; Addison, IL
Roof Products and Systems Corp

PREFABRICATED PIPE CURBS:

Provide pipe curbs for all pipes or conduits passing thru roof. This includes all roofs.

Coordinate sizes required with number of pipes required.

Units shall be The Vault Roof Penetration.

Sloping Roofs: Where slope of roof deck exceeds 1/4" per ft., fabricate curb/support units with height tapered to match slope, to result in level installation of tops of units.

Manufacturer: Subject to compliance with requirements, provide prefabricated curbs/equipment supports by one of the following:

The Vault Roof Penetration Housing (coordinate size and configuration with Electrical and Mechanical requirements).

PART 3 - EXECUTION

INSTALLATION:

General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and with vapor barriers, roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weather-tight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

Except as otherwise indicated install roof accessory items in accordance with construction details of "NRCA Roofing and Waterproofing Manual".

Isolation: Where metal surfaces of units are to be installed in contact with non-compatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.

Contractor: Do not allow trades mounting equipment to penetrate top side of copings or counter flashings with fasteners.

All fastening shall be through vertical sides of counter flashings or copings.

Curbs used for expansion and as roof dividers shall extend to edge of roof.

CLEANING AND PROTECTION:

Clean exposed metal and plastic surfaces in accordance with manufacturer's instructions. Touch up damaged metal coatings.

End of Section 077000

SECTION 079000 - JOINT SEALERSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SYSTEM PERFORMANCE REQUIREMENTS:

Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

SUBMITTALS:

General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

Product data from manufacturers for each joint sealant product required.

Joint-Sealant Schedule: Include the following information:

- Joint-sealant application, joint location, and designation.
- Joint-sealant manufacturer and product name.
- Joint-sealant color.

QUALITY ASSURANCE:

Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

Pre-Installation Conference: Conduct conference at Project site to comply with requirements of the Division 1 Section covering this activity.

DELIVERY, STORAGE, AND HANDLING:

Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

PROJECT CONDITIONS:

Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:

When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer.

When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg F (4.4 deg C).

When joint substrates are wet.

Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

Pre-Construction Field Adhesion Testing: Before installing sealants, field test their adhesion to project joint substances as follows:

Locate test joints where directed by Architect.

Conduct field tests for the following applications:

Concrete precast joints.

Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

PART 2 - PRODUCTSMATERIALS, GENERAL:

Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

Colors: Provide color of exposed joint sealants to comply with the following:

Match colors of adjacent wall paint at interior masonry control joints.

ELASTOMERIC JOINT SEALANTS:

Products: Subject to compliance with requirements, provide one of the following products.

SOLVENT-RELEASE-CURING JOINT SEALANTS:

Acrylic Sealant: Manufacturer's standard one-part, nonsag, solvent-release-curing acrylic terpolymer sealant complying with AAMA 808.3 or FS TT-S-00230 or both, with capability when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the following percentage change in joint width existing at time of application and remain adhered to joint substrates indicated for Project without failing cohesively:

7-½ percent movement in both extension and compression for a total of 15 percent.

12-½ percent movement in both extension and compression for a total of 25 percent.

Butyl Sealant: Manufacturer's standard one-part, nonsag, solvent-release-curing, polymerized butyl sealant complying with ASTM C 1085 and formulated with minimum of 75 percent solids to be nonstaining, paintable, and have a tack-free time of 24 hours or less.

Pigmented Narrow Joint Sealant: Manufacturer's standard, solvent-release-curing, pigmented synthetic rubber sealant complying with AAMA 803.3 and formulated for sealing joints 3/16 inch or smaller in width.

Available Products: Subject to compliance with requirements, solvent-release-curing joint sealants that may be incorporated in the Work include, but are not limited to, the following:

Products: Subject to compliance with requirements, provide one of the following:

Acrylic Sealant:

"60+Unicrylic," Pecora Corp.

"PTI 738," Protective Treatments, Inc.

"PTI 767," Protective Treatments, Inc.

"Mono 555" Tremco, Inc.

Butyl Sealant:

"BC-158," Pecora Corp.
CHEM-CALK 300, Bostile, Inc.
"Tremco Butyl Sealant," Tremco, Inc.

Multicomponent Nonsag Polysulfide Sealant : Where joint sealants of this type are indicated, provide products complying with the following:

Products: Provide one of the following

CM-60; W.R Meadows, Inc.
T-2235-M; Morton International, Inc.
T-2282; Morton International, Inc.
Thiokol 2P; Morton International, Inc.
GC-5 Synthacalk; Pecora Corporation.
Two-Part Sealant; Sonneborn Building Products Div., ChemRex Inc.

Type and Grade: M (multicomponent) and NS (nonsag).

Class: 25.

Use[s] Related to Exposure: T (Traffic)

LATEX JOINT SEALANTS:

General: Provide manufacturer's standard one-part, nonsag, mildew-resistant, paintable latex sealant of formulation indicated that is recommended for exposed applications on interior and protected exterior locations and that accommodates indicated percentage change in joint width existing at time of installation without failing either adhesively or cohesively.

Acrylic-Emulsion Sealant: Provide product complying with ASTM C 834 that accommodates joint movement of not more than 25 percent in both extension and compression for a total of 50 percent.

Products: Subject to compliance with requirements, provide one of the following:

Acrylic-Emulsion Sealant:

"AC-20+," Pecora Corp.
"Sonolac," BASF Building Systems
"Tremflex 834," Tremco, Inc.

JOINT SEALANT BACKING:

General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

Open-cell polyurethane foam.

Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.

Proprietary, reticulated, closed-cell polymeric foam, nonoutgassing, with a density of 2.5 pcf and tensile strength of 35 psi per ASTM D 1623, and with water absorption less than 0.02 gms/cc per ASTM C 1083.

Any material indicated above.

Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

URETHANE JOINT SEALANTS:

Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use NT, M, A, and O.

Products: Subject to compliance with requirements, available products that may be incorporated into the work include, but are not limited to, the following:

Pecora Corporation; Dynatrol II.
Polymeric Systems, Inc.; PSI-270.
Tremco Incorporated; Dymeric 240, Dymeric 240 FC

Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use T, M, A, and O.

Products: Subject to compliance with requirements, available products that may be incorporated into the work include, but are not limited to, the following:

Polymeric Systems, Inc.; PSI-270.
Tremco Incorporated; Dymeric 240 FC.

MISCELLANEOUS MATERIALS:

Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.

Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTIONINSTALLATION:Exterior Joints:

All exterior door, louver, window, or similar openings abutting masonry or concrete and stone, concrete, or other joints as shown on the drawings shall be caulked for the entire perimeter or length with exterior caulking. Caulk all expansion joints, control joints, and other areas noted on the drawings. Caulk joints where masonry abuts steel or concrete.

All other exterior joints in concrete paving and as indicated or shown.

Interior Joints:

All interior door, louver, window, or similar openings abutting masonry or concrete and stone, concrete, or other joints as shown on the drawings shall be caulked for the entire perimeter or length with exterior caulking. Caulk all expansion joints, control joints, and other areas noted on the drawings. Caulk joints where masonry abuts steel or concrete. All other interior joints as indicated or shown.

Sound calk all intersections of walls carried to roof decks at sound partitions.

Where floor tees, roof tees, columns, beams or column/beam connections occur in a rated or smoke wall condition, fire caulk/firestop all joints that are a part of the rated or smoke conditions, see Section 072700, Firestopping.

Caulk all control joints and at raked intersecting masonry walls.

All other interior joints as indicated or shown.

Caulk entire joint at windows and walls of all window stools.

Mop Basins: Caulk junction of basin with all surfaces.

Thresholds: All metal door thresholds and saddles shall be completely bedded in caulking compound. Caulk with exterior caulking the joints between thresholds and door frames.

Miscellaneous Interior Caulking:

Where urinals, lavatories, cabinet backsplashes, or countertops abut walls, install a thin line of caulking at walls; tool joint to provide closures of all cracks and openings, and for a uniform joint appearance.

Ceramic and Quarry Tile: Install a bead of caulking at the top of all tile bases and walls prior to painting. Caulk shall match tile joint color as close as possible.

EXAMINATION:

Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

PREPARATION:

Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:

Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

Remove laitance and form release agents from concrete.

Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

INSTALLATION OF JOINT SEALANTS:

General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

Install sealant backings of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

Do not leave gaps between ends of sealant backing.

Do not stretch, twist, puncture, or tear sealant backing.

Remove absorbent sealant backing that have become wet prior to sealant application and replace with dry material.

Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.

Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

Provide concave joint configuration per Figure 8A in ASTM C 1193, unless otherwise indicated.

Provide flush joint configuration, per Figure 8B in ASTM C 1193, where indicated.

Use masking tape to protect adjacent surfaces of recessed tooled joints.

Provide recessed joint configuration, per Figure 8C in ASTM C 1193, of recess depth and at locations indicated.

Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, and to comply with sealant manufacturer's directions for installation methods, materials, and tools that produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's recommendations.

CLEANING:

Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

PROTECTION:

Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that and installations with repaired areas are indistinguishable from original work.

End of Section 079000

SECTION 079010- ROOFING SYSTEMS - GENERALPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.

QUALITY ASSURANCE:

Subcontract the roofing and associated work to a single firm, called the "Installer" in this Section, so that there will be undivided responsibility for the specified performance of all component parts, including the following (even though some parts may be sub-contracted to others).

- Roofing
- Roof accessories
- Roofing, including composition flashing
- Flashing in connection with roofing
- Counter flashing in connection with roofing
- Expansion joints in connection with roofing

Qualifications of Applicator: Applicator shall be one who can furnish an affidavit from the Roofing Materials Manufacturers certifying that the applicator has satisfactorily applied the type of roof specified on projects which have been complete for at least five (5) years.

Applicator's Field Supervision: Applicator must maintain full- time supervisor/foreman on job site during times that roofing work is in progress. Supervisor must have minimum of 5 years experience in roofing work similar to nature and scope to specified roofing.

Pre-Roofing Conference:

Pre-Roofing Conference shall be conducted for EACH TYPE OF ROOFING.

Prior to the installation of the roofing and associated work, meet at the project site with:

- Owner
- Architect/Engineer
- Contractor's Project Manager
- Contractor's Job Superintendent
- Roofing Manufacturer
- Roofing Contractor
- Roofing Contractor's Foreman who will actually be on roof while work is being installed.

Record (by Contractor) the discussions of the conference and the decisions and agreements (or disagreements) reached, and furnish a copy of the record to each party attending.

Review foreseeable methods and procedures related to the roofing work, including but not necessarily limited to the following:

Review project requirements (drawings, specifications, and other contract documents, and in particular re-roofing work).

Review required submittals, both completed and yet to be completed.

Review status of substrate work (not by the roofing Installer), including drying, structural loading limitations and similar considerations.

Review availability of materials, tradesmen, equipment, and facilities needed to make progress and avoid delays.

Review required inspection, testing, certifying, and accounting procedures.

Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including the possibility of temporary roofing.

Review regulations concerning code compliance, environmental protection, health, safety, fire, and similar considerations.

Review procedures needed for protection of roofing during the remainder of the construction period.

Weather Condition Limitations:

Proceed with roofing and associated work only when weather conditions will permit unrestricted use of materials and quality control of the work being installed, complying with the requirements and with the recommendations of the roofing materials manufacturers.

INSPECTION OF SUBSTRATE:

The Installer must examine the surface conditions of the re-roofing work and associated work.

The Installer must examine the surface conditions of the substrates to receive roofing and associated work, and ascertain the conditions under which the work will be performed, and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with roofing and associated work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

Coordinate the installation of roofing materials and associated work so as to provide a complete system complying with the combined recommendations of manufacturers and installers involved in the work.

Cooperate with inspection and test agencies engaged by the Owner (or otherwise required) to perform services in connection with roofing and associated work.

Product Handling, Storage, and Delivery:

Deliver materials in manufacturer's original unopened containers and rolls with labels intact and legible.

Deliver materials in quantity to allow continuity of work.

Prevent damage of rolled goods to edge or ends.

Store materials on raised platforms with weather protective covering when stored outdoors.

Store rolled goods on end.

Provide continuous protection of materials against wetting and moisture absorption.

Protect materials against damage by construction traffic.

Remove wet materials from project site.

Comply with fire and safety regulations.

Store emulsions in temperature above 40 deg. F. (4 deg. C.).

Job Conditions:

Apply roofing in dry weather.

Do not apply roofing when ambient temperature is below 40 deg. F. (4 deg. C.).

Lap protective material at least 6".

Vent polyethylene, if used, to prevent collection of moisture on covered surfaces.

Secure protective coverings against wind.

Leave protective covering in place for duration of roofing work.

PART 2 - PRODUCTSMATERIALS:ROOF PANELS:

Roof Panels shall be McElroy Metal, Inc. Medallion-Lok Standing Seam System, 1-³/₄" high standing seam, straight and custom tapered roof systems, with spacing 18" maximum, 24 gage galvalume with Kynar 500 finish. Panels shall be factory manufactured in continuous lengths for the required slopes. Lap joints in panel length are not acceptable.

Color: As selected by Architect from Manufacturer's full selection of standard and premium colors.

Installation Tolerances: Shim and align panel units within installed tolerance of ¹/₄ inch in 20 feet (6 mm in 6 m) on level, plumb, and location lines as indicated and within ¹/₈-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

All flashing and trim, transition rib covers at changes in roof direction, gutters and downspouts for roof and wall panels shall be of the same material, gauge, finish and color as the roof panels and fabricated in accordance with Standard SMACNA Procedures and Details.

ACCEPTABLE MANUFACTURERS:Roof Panels:

AEP-Span.
Atlanta Metal Products, Inc.
Atlanta Metal Systems
Berridge Manufacturing Co.
Dimensional Metals, Inc.
IMETCO
MBCI
McElroy Metal, Inc.
Peterson Aluminum Corporation

METAL FINISHES:

General: Apply coatings either before or after forming and fabricating panels, as required by coating process and as required for maximum coating performance capability. Protect coating either by application of strippable film or by packing plastic film or other suitable material between panels in a manner to properly protect the finish. Furnish air-drying spray finish in matching color for touch-up.

Color: As selected by Architect from Manufacturer's full selection of standard and premium colors.

Fluoropolymer Coating: Manufacturer's standard two-coat, thermo-cured, full-strength 70 percent "Kynar 500" coating consisting of a minimum 0.2 mil primer and a minimum 0.8-mil dry film thickness finish coat with a total minimum dry film thickness of 1.0 mil +/- 0.2 mil and 30 percent reflective gloss when tested in accordance with ASTM D 523.

Durability: Provide coating that has been field tested under normal range of weathering conditions for minimum of 20 years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of No. 8 in accordance with ASTM D 659; and without fading in excess of 5 NBS units.

Accessories: Except as indicated as work of another specification section, provide components required for a complete roofing system, including corner units, ridge closures, clips, sealants, gaskets, filler, closure strips and similar items. Match materials/finishes of preformed panels.

Fasteners:

Clips to substrate - Screw shall be #12, low profile pancake head self tapping type, zinc plated steel.

Trim to panels - exposed screws shall be zinc plated with 5/8 diameter combination steel and neoprene washer, color to match panel.

Pop Rivets - #43 stainless steel, color finish to match panel.

Top Closure Strips: Provide formed closure strips to conform to seam spacing at point of closure. Strip shall be "Z" shape with end tabs to contact seams at each end. Cut to match configuration of roof panels. Provide closure strips where indicated or necessary to ensure weathertight construction.

All contact with closure and panels or flashing shall be set in tape sealant.

Sealing Tape: Pressure-sensitive 100 percent solids polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

Joint Sealant: One-part elastomeric polyurethane, polysulfide, or silicone rubber sealant as recommended by the building manufacturer.

Bituminous Coating: Cold-applied asphalt mastic, SSPC paint 12, compounded for 15 mil dry film thickness per coat.

PANEL FABRICATION; PERFORMANCES:

General: Fabricate and finish panels and accessories at the factory by manufacturer's standard procedures and processes.

Face Sheets: Fabricate roof panel face sheets to the profile or configuration indicated from 24 gauge, G90 galvanized smooth steel sheets.

End of Section 079010

SECTION 079020 - ROOF INSULATIONPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.

QUALITY ASSURANCE:

Installer: Subcontract each type of insulation work in this section to the Installer of the associated roofing for undivided responsibility.

Fastener patterns for roof insulation shall comply with Factory Mutual FM I-90 for wind uplift.

SUBMITTALS:Manufacturer's Data, Roof and Deck Insulation:

For information only, submit two copies of manufacturer's specifications and installation instructions for each type of insulation required. Include data substantiating that the materials comply with specified requirements. Indicate by copy of transmittal form that Installer has received copy of manufacturers instructions.

Inspection Report: Installer shall submit in writing to the Architect that he has inspected the roof deck and that it complies with the requirements as stated under paragraph JOB CONDITIONS.

PRODUCT HANDLING:

Protection from Deteriorations: Do not allow insulation materials to become wet or soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

Do not overload the building structure with the storage of materials or use of equipment on the deck. Consult the Architect for allowable loading factors.

JOB CONDITIONS:

NOTE: The purpose of this section relating to B-U Roofing is to provide guidance for insulation that must be replaced as a result of work required on existing roof areas not being re-roofed with TPO membrane. Contractor shall verify existing overall insulation thickness in those locations and match existing thickness.

Do not proceed with installation of roof or deck insulation unless the materials, equipment and tradespersons for the installation of the roofing membrane over the insulation are at the project site and ready to follow with this work immediately (same day) behind the insulation work. Do not install any more insulation each day than can be covered with waterproof membrane by the end of that working day.

Examination of Substrate: The Installer must examine the substrate and the conditions under which the insulation work is to be performed, and notify the Contractor in writing of any unsatisfactory conditions. Do not proceed with the insulation work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

Verify that flatness and fastening of metal roof decks comply with the following:

Top Flanges: No concavity or convexity in excess of 1/16" across any 3 adjacent flanges.

Side Laps: Properly nested and mechanically fastened at max. spacing of 18" o.c.

End Laps: Minimum 2" laps located over and fastened to supports.

Deck secured to each supporting member in every other rib (max. spacing 12" o.c.) with welding washers or approval mechanical fasteners.

PART 2 - MATERIALS

Roof Insulation - New Construction w/ TPO Membrane on Metal Deck (Flat Roof):

Roof insulation shall be in two layers with cover board.

The bottom layer shall be 2" thick, with an "R" of 11.4. The second layer shall be 2" thick, with an "R" of 11.4. Both layers shall be made of non-asphaltic glass matt facers bonded to a core of closed-cell isocyanurate foam. Top layer shall be a 1/2" thick high density cover board: Polyisocyanurate, non-combustible, water resistant, closed cell foam core with coated glass mat facers, min. 120 psi and R-value of 2.5.

Roof Insulation - TPO Membrane over B-U Re-roof areas (Flat Roof):

Roof insulation shall be one layer with cover board.

Install mechanically fastened layer of 1" thick insulation, with an "R" of 5.7, made of non-asphaltic glass matt facers bonded to a core of closed-cell isocyanurate foam. Top layer shall be a 1/2" thick high density cover board: Polyisocyanurate, non-combustible, water resistant, closed cell foam core with coated glass mat facers, min. 120 psi and R-value of 2.5. See drawings for areas of tapered insulation forming counter slope for roof drains.

Roof Insulation - B-U Re-roof areas requiring insulation replacement Metal Deck (Flat Roof):

Roof insulation shall be in two layers.

The bottom layer shall be made of non-asphaltic glass matt facers bonded to a core of closed-cell isocyanurate foam and shall match the original insulation thickness. Top layer shall be a thermal insulation board composed of perlite and shall match the original second layer thickness. Overall thickness of approximately 3" and approximate R-15. Top surface must match overall original thickness to prevent blocking water drainage.

Celotex Corp.
Atlas Energy Products.
Johns Manville
GAF
Firestone ISO 95+ GL

Tapered Edge Insulation: Shall be tapered perlite Fed. Spec. HH-1-529 and ASTM C-728-72 or glass fiber boards. Taper shall be 1-1/2" x 24" x 48". Surface treated for enhanced asphalt bond.

International Permalite, Inc. "Permalite Tapered Roof Insulation".
Johns Manville Roofing Systems Division "Fesco Dri-Deck, Factory Tapered".
J&P Petroleum Products, Inc "Tex-Taper".
Lucas Industries, Inc. Lucas Tapered System".
Sibo, inc. "Tapered Fiberglas".
Firestone ISO 95+ GL, for flat and tapered.

Preformed Cant Strips: Where preformed cant strips of insulation material are shown or required by the roofing manufacturer's specifications, provide units supplied by the manufacturer's of the associated insulation, and formed of the same material. If such units are not produced by the insulation manufacturer, provide units formed of asphalt-impregnated organic fiber insulation material, unless otherwise indicated.

PART 3 - EXECUTION

Installation - General:

Multiple-Layer Installation: Install required thickness in multiple layers with joints of second or subsequent layers staggered from joints of previous layer a minimum of 12 inches each direction. First layer shall be mechanically attached. Subsequent layers shall be mopped in.

Trim surface of insulation where necessary at roof drains so completed surface is flush with ring of drain.

Comply with manufacturer's instructions for the particular conditions of installation in each case. If printed instructions are not available or do not apply to the project conditions, consult the manufacturer's technical representative for specific recommendations before proceeding with the work.

Insulation shall be laid in courses parallel to edges with the mopping surface up.

All insulation shall be cut and fitted where roof deck intersects vertical surfaces, but shall be kept ¼" from all vertical flashings.

Crickets shall be formed with uniform transitions at ridges and valleys. Uneven transitions will not be acceptable.

Edges of insulation boards shall be mitered at ridges and elsewhere to prevent open joints or irregular surfaces. Edges shall be butted to provide moderate contact, but not deformed.

Edges shall be supported on ribs of steel deck. At perimeters provide solid insulation, or blocking to support insulation edge. Provide tapered edge perlite insulation at perimeters to provide positive drainage at gutters and to form blocking/insulation flush joint at slopes to interior drainage.

Metal Decks (Flat/ Sloped Roof):

Secure both layers of insulation to deck at the same time, installing only as much as can be covered during that day's work period, using mechanical fasteners specifically designed and sized for attachment of specified board type insulation to deck type shown. Fasten insulation over entire area of roofing at spacing as required by FM for Windstorm Resistance Classification I-90. Run long joints for insulation in continuous straight lines, perpendicular to roof slope with end joints staggered between rows.

At roof drains provide a min. 4 ft. x 4 ft. , or as required for insulation depth, tapered insulation transition to drain. Tapered insulation shall slope ¼" per foot.

PROTECTION:

Do not permit construction-period traffic over completed insulation work, except as required for roofing.

Protect insulation work from exposure to moisture, damage and deterioration, primarily by prompt installation of ice and water shield work shown to be placed over the insulation. Remove and replace insulation work which has become wet, damaged or deteriorated before proceeding with other work. Test for moisture content, by suitable means, wherever there is a possibility that exposed insulation work has acquired moisture in excess of the maximum content for optimum application of roofing or waterproofing.

End of Section 079020

SECTION 081100 - STEEL DOORS AND FRAMESPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of standard steel doors and frames is shown and scheduled on drawings.

Finish hardware is specified elsewhere in Division 8.

QUALITY ASSURANCE:

Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.

Manufacturer: Provide custom steel doors and frames by a single firm specializing in production of this type of work.

Provide steel doors and frames by one of the following:

Amweld Building Products, LLC

Ceco Corp.

Curries Mfg. Inc.

D & D Specialties

Kewanee Corporation

SteelCraft Mfg. Co.

Habersham

Fire-Rated Assemblies: Provide fire-rated doors investigated and tested as fire door assemblies, complete with type of hardware to be used. Identify each fire door with recognized testing laboratory labels, indicating applicable fire rating of steel doors. Construct and install assemblies to comply with NFPA Standard No. 80, and as herein specified.

SUBMITTALS:

Product Data: Submit manufacturer's specifications for fabrication and installation, including data substantiating that products comply with requirements.

Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

DELIVERY, STORAGE AND HANDLING:

Deliver hollow metal work cartoned or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory finished doors.

Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided finish items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

In addition to the shop prime coat, immediately upon job site delivery of all metal door frames and lites, prime frames two feet up from sill (inside and out) as specified under PAINTING.

Store doors and frames at building site under cover. Place units on wood sills at least 4" high, or otherwise store on floors in manner that will prevent rust and damage. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide ¼" spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTSMATERIALS:

Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.

Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.

Supports and Anchors: Fabricate of not less than 18 gauge galvanized sheet steel.

Inserts, Bolts and Fasteners: Manufacturer's standard units.

Shop Applied Paint:

Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.

FABRICATION, GENERAL:

Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle, and with mitered corners, welded and ground smooth.

Fabricate Hollow Metal Doors with top edge of exterior doors closed flush with 16 gauge channel and welded seamless. Vertical edges shall be seamless, welded, ground smooth, and beveled ⅛" in 2".

Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

Applied Stops: Formed 20 gauge steel with mitered corners. Attach using countersunk oval head machine screws at 1'-0" max. o.c. No snap glazing stops will be allowed.

Glazing frames for door lites shall have face sloped from glass to face of door, overlapping and covering door face cut-out. Inner and outer frame shall be secured with blind fasteners or SNB fasteners at door lites.

Finish Hardware Preparation:

Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A 115 series specifications for door and frame preparation for hardware.

Reinforce doors and frames to receive surface-applied hardware. Plate reinforcement shall be minimum 3/16" welded to frame or doors. On exterior frames there shall be a 3/16" plate reinforcement the full width of the jamb by 10" length at each hinge. Drilling and tapping for surface-applied finish hardware may be done at project site.

Where thru-bolting occurs, reinforcing shall contact both faces of the doors to prevent buckling.

Locate finish hardware as shown on final shop drawings or, if not shown, in accordance with "Recommended Locations for Builder's Hardware," published by Door and Hardware Institute.

Shop Painting:

Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.

Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

STEEL DOORS:

Provide metal doors of types and styles indicated on drawings or schedules.

Exterior Doors: 16 gauge and shall be insulated. Minimum .09 U value, solid urethane. Provide integral astragals as scheduled. Vertical edge bevel 1/8" in 2".

Interior Doors: 16 gauge

STEEL FRAMES:

Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated.

Fabricate frames with mitered and welded corners, ground smooth.

All frames used in exterior walls shall have all joints fabricated weathertight.

Exterior Door Frames: 16 gauge.

Interior Door and Fixed Window Frames: 16 gauge

Door Silencers: Except on weatherstripped frames, drill stops to receive 2 silencers on strike jambs of single-swing frames and 3 silencers on heads of double-swing frames.

Plaster Guards: Provide 26 gauge steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation.

Hollow metal manufacturer shall coordinate astragal requirements for steel doors with Section 087100, Finish Hardware and Door Schedule on drawings.

PART 3 - EXECUTIONINSPECTION:

Installer must examine substrate and conditions under which steel doors and frames are to be installed and must notify Contractor in writing of any conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

INSTALLATION:

General: Install standard steel doors, frames, and accessories in accordance with final shop drawings and manufacturer's data, and as herein specified.

Placing Frames:

Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames", unless otherwise indicated.

Except for frames located at in-place concrete or masonry and at drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels. Building-in of anchors and grouting of frames is specified in Division 4.

Install fire-rated frames in accordance with NFPA Std. No. 80.

Door Installation:

Fit hollow metal doors accurately in frames, within clearances specified in SDI-100.

Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

ADJUST AND CLEAN:

Prime Coat Touch-Up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.

Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

End of Section 081100

SECTION 082110 - WOOD DOORSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work specified in this section.

SUMMARY:

Extent and location of each type of wood door is shown on drawings and in schedules.

Types of doors required include the following:

Solid core flush wood doors with veneer faces.

SUBMITTALS:

Product Data: Door manufacturer's technical data for each type of door, including details of core and edge construction, trim for openings and louvers, and factory-finishing specifications.

Shop Drawings: Submit shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, and fire ratings.

QUALITY ASSURANCE:

Quality Standards: Comply with the following standards:

NWWDA Quality Standard: I.S.1 "Industry Standard for Wood Flush Doors", of National Wood Window and Door Association (NWWDA).

AWI Quality Standard: "Architectural Woodwork Quality Standards", including Section 1300 "Architectural Flush Doors", of Architectural Woodwork Institute (AWI) for grade of door, core construction, finish and other requirements exceeding those of NWWDA quality standard.

Fire-Rated Wood Doors: Provide wood doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA

Test Pressure: Test at atmospheric pressure. After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches (1000 mm) or less above the sill.

Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.

Note: All doors in all walls with time ratings (including 20 minutes) shall be positive pressure doors, Category A only.

PRODUCT DELIVERY, STORAGE, AND HANDLING:

Protect doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations of NWWDA pamphlet "How to Store, Handle, Finish, Install, and Maintain Wood Doors", as well as with manufacturer's instructions.

Identify each door with individual opening numbers which correlate with designation system used on shop drawings for door, frames, and hardware, using temporary, removable or concealed markings.

PROJECT CONDITIONS:

Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during remainder of construction period to comply with the following requirements applicable to project's geographical location:

Referenced AWI quality standard including Section 100-S-3 "Moisture Content".

WARRANTY:

Provide manufacturers warranty agreeing to repair or replace wood doors which have:

Delamination in any degree
Warping or twisting of 1/4" or more in plane of door face
Telegraphing of stile, rail or core through face to cause surface variation in excess of 1/100"
in any 3" span

Warranty shall be in effect for the life of the original installation for interior use.

All other warranties and bonds are to be in accordance with Division 1, Section 017000 - Project Close-out.

PART 2 - PRODUCTS

Manufacturer: Subject to compliance with requirements, provide doors of one of the following:

Solid Core Doors with Wood Veneer Faces:

Algoma

Eggers Industries, Architectural Door Division.

Graham

Marshfield

V.T. Industries, Inc.

Solid Core Doors for Transparent Finish: Comply with the following requirements:

Faces: Uniform White Birch, rotary cut. Top, bottom and edges shall be same species as face veneers.

AWI Grade: Custom

Construction: SCL 5 (Structural Core Lumber, 5-ply)

Doors shall be delivered to the site factory pre-finished in the color selected by the Owner.

Fire-Rated Solid Core Doors: Comply with the following requirements:

Faces and AWI Grade: Provide faces and grade to match non-rated doors in same area of building, unless otherwise indicated.

Construction: Manufacturer's standard core construction as required to provide fire-resistance rating indicated.

Edge Construction: Provide manufacturer's standard laminated edge construction for improved screw-holding capability and split resistance as compared to edges composed of a single layer of treated lumber.

Blocking: Provide manufacturer's optional wood blocking at top and bottom rails, intermediate rails, and lock blocking.

LIGHT FRAMES:Metal Frames for Light Openings in Fire Doors and Non-rated Doors:

All metal frames shall have sloped face, overlap door cutout and be secured by blind fasteners one side or SNB, except where double glazed frames are required. Frames shall be factory-primed for field painting to match door frame.

Double Glazed:

Shall be 18-gauge cold-rolled steel, factory-primed, for double glazing and approved for use in door of fire-rating indicated. Frame shall be equal to Air Louvers, Inc. rectangular visionlite frames type VLF-DG

Use for all doors where indicated, including "B" and "C" label wood doors.

Single Glazed:

Shall be 18-gauge cold-rolled steel, factory-primed, and approved for use in door of fire-rating indicated.

Use for all doors except double glazed frames, including "B" and "C" label wood doors.

FABRICATION:

Fabricate flush wood doors to produce doors complying with following requirements:

In sizes indicated for job-site fitting.

Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of doors required.

Light Openings: Trim openings with 18 gauge steel frames identical to metal frames for light openings in fire doors." Match metal frame to single or double glazing.

PART 3 - EXECUTIONEXAMINATION:

Examine installed door frames prior to hanging door:

Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.

Reject doors with defects.

Do not proceed with installation until unsatisfactory conditions have been corrected.

INSTALLATION:

Hardware: For installation see Division-8 "Finish Hardware" section of these specifications.

Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and of referenced AWI standard and as indicated.

Install fire-rated doors in corresponding fire-rated frames in accordance with requirements of NFPA No. 80.

Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors.

Machine doors for hardware. Seal cut surfaces after fitting and machining.

Fitting Clearances for Non-Rated Doors: Provide 1/8" at jambs and heads; 1/16" per leaf at meeting stiles for pairs of doors; and 1/8" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" clearance from bottom of door to top of threshold.

Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.

Bevel non-rated doors 1/8" in 2" at lock and hinge edges.

Bevel fire-rated doors 1/4" in 2" in lock edge; trim stiles and rails only to extent permitted by labeling agency.

Field-Finished Doors: Refer to the following for finishing requirements:

Division-9 section "Painting".

ADJUSTING AND PROTECTION:

Operation: Rehang or replace doors which do not swing or operate freely.

Finished Doors: Refinish or replace doors damaged during installation.

Protect doors as recommended by door manufacturer to ensure that wood doors will be without damage or deterioration at time of Substantial Completion.

End of Section 082110

SECTION 083050 - ACCESS DOORSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY:

This Section includes the following types of access doors:

Wall access doors.

Fire-rated wall access doors.

Ceiling access doors.

Fire-rated ceiling access doors.

Related Sections: The following Sections contain requirements that relate to this Section:

Division 4 Sections for building in anchors and grouting frames set in masonry construction.

Division 7 Section "Roof Accessories" for roof hatches.

Division 8 Section "Door Hardware" for mortise or rim cylinder locks.

Division 9 Section "Gypsum Board Assemblies" for gypsum board walls and ceilings.

Division 9 Section "Tile" for ceramic tile walls.

Division 9 Section "Acoustical Tile Ceilings" for access tile in suspended or furred acoustical tile ceilings.

Division 15 Section "Duct Accessories" for duct access doors.

SUBMITTALS:

General: Submit each item in this Article according to the Conditions of Contract and Division 1 Specification Sections.

Product data for each type of access door assembly specified, including details of construction relative to materials, individual components, profiles, finishes, and fire-protection ratings (if required).

Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, latching or locking provisions, and other data pertinent to installation.

Shop drawings showing fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage, and accessory items.

QUALITY ASSURANCE:

Single-Source Responsibility: Obtain access doors for entire Project from one source and by a single manufacturer.

Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies tested for fire-test-response characteristics per test method as indicated below, and are labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.

Test Method for Vertical Installations: ASTM E 152.

Test Method for Horizontal Installations: ASTM E 119.

Size Variations: Obtain Architect's acceptance of manufacturer's standard size units, which may vary slightly from sizes indicated.

COORDINATION:

Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule specified under "Submittals" Article.

PART 2 - PRODUCTS

MANUFACTURERS:

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- Acudor Products Inc.
- Bar-Co, Inc. Div., Alfab, Inc.
- Cesco Products.
- Elmdor Manufacturing Co.
- J.L. Industries.

Karp Associates, Inc.
Larsen's Manufacturing Co.
Milcor, Inc.
Nystrom, Inc.
The Williams Bros. Corporation of America.

MATERIALS:

Zinc-Coated Steel Sheet: ASTM A 591/A 591M, Electrolytic zinc-coated steel sheet with Class C coating and phosphate treatment to prepare surface for painting.

ACCESS DOORS: November 29, 2021

Insulated, Fire-Rated Access Doors: Self-latching units consisting of frame, trim, door, insulation, and hardware, including automatic closer, interior latch release, and complying with the following requirements:

Frame with Exposed Trim: Perimeter frame with integral exposed trim complying with the following requirements:

Metal: 0.0598-inch (1.52-mm) thick zinc-coated steel sheet.

Trim: 1-inch (25.4-mm) flange overlapping surfaces surrounding door frame.

Frame Configuration: Flange integral with frame and overlapping face of adjoining gypsum board, with surface formed to receive joint compound.

Door: 0.0359-inch (0.91-mm-) thick zinc-coated steel sheet, welded pan type.

Hinges: Continuous type.

Latches: Bolt type, operated by flush key device (keyed alike).

Insulation: 2-inch- (50.8-mm-) thick mineral-fiber insulation.

Fire-Protection Rating for Walls: 1-½ hours.

Fire-Protection Rating for Ceilings: 1 hour

Provide rated access panels for all ceilings in toilet batteries with cased openings to corridor.

Noninsulated, Fire-Rated Doors for Walls: Self-latching units consisting of frame, trim, door, and hardware, including automatic closer, interior latch release, and complying with the following requirements:

Frame: 0.0598-inch (1.52-mm) thick zinc-coated steel sheet.

Door: 0.0598-inch (1.52-mm) thick zinc-coated steel sheet.

Hinge: Continuous type.

Latches: Bolt type, operated by flush key device (keyed alike).

Fire-Protection Rating for Walls: 1-½ hours.

FABRICATION:

General: Manufacture each access door assembly as an integral unit ready for installation.

Steel Access Doors and Frames: Continuous welded construction. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

Exposed Flange: Nominal 1 to 1-½ inches (25.4 to 38.1 mm) wide around perimeter of frame.

For full-bed plaster applications, furnish frames with galvanized expanded metal lath and exposed casing bead, welded to perimeter of frame.

For installation in masonry construction, furnish frames with adjustable metal masonry anchors.

Locking Devices: Furnish number required to hold door in flush, smooth plane when closed.

For cylinder lock, furnish 2 keys per lock and key all locks alike.

PART 3 - EXECUTION

PREPARATION:

Advise Installers of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices. Furnish inserts and anchoring devices for access doors that must be built into other construction. Coordinate delivery with other work to avoid delay.

INSTALLATION:

Comply with manufacturer's instructions for installing access doors.

Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finished surfaces.

ADJUST AND CLEAN:

Adjust hardware and panels after installation for proper operation.

Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

End of Section 083050

SECTION 084100 - ALUMINUM STOREFRONT WORKPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of storefront work (fixed window units) is shown on drawings and schedules.

Work required includes the following:

Fixed frame window units.

Glazing: Refer to "Glass and Glazing" section of Division 8 for glazing requirements for aluminum entrances, including doors specified herein to be factory preglazed.

QUALITY ASSURANCE:

Drawings are based on one manufacturer's standard aluminum entrance and storefront system. Another standard system of a similar and equivalent nature will be acceptable when differences do not materially detract from design concept or intended performances, as judged solely by Architect.

Installation of the aluminum storefront systems shall be by an installer who has extensive experience in performing work of this section and who has specialized in the installation of work similar to that required for the particular project. Installer shall be acceptable to and approved by the product manufacturer.

Storefront assemblies shall be designed and installed to comply with Sections 2403.2, 2403.3, 2404.1 and 2404.2 of the International Building Code.

SUBMITTALS:

Product Data: Submit manufacturer's specifications, standard details, and installation recommendations for components of aluminum entrances required for project.

Shop Drawings: Submit shop drawings for fabrication and installation of aluminum entrances, including elevations, detail sections of typical composite members, hardware mounting heights, anchorages, reinforcement, expansion provisions, and glazing.

Shop drawings shall show type, size and spacing of anchorage to comply with Sections 2403.2 and 2403.3 of the International Building Code.

STORAGE AND PROTECTION:

All storefront materials shall be protected against damage from harmful weather conditions, chemicals, construction activities, and any other hazards before, during and after installation.

WARRANTY:

Finish Warranty: Warrant fluoropolymer coating to remain free of checking, crazing peeling, chalking or fading for a period of five (5) years, beginning at Date of Substantial Completion.

PART 2 - PRODUCTSACCEPTABLE MANUFACTURES:

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

Alumiline Aldora.
Amarlite/Arco Metals Co.
Kawneer Company, Inc.
PPG Industries, Inc.
Tubelite Div., Indal Inc.
United States Aluminum Corp., International Alum. Corp.
YKK APP America, Inc.

Basis of Design:

Trifab VG 451T Framing System as manufactured by Kawneer Company, Inc.

Alloys: Frames shall be fabricated of 6063-T5 alloy. Aluminum shall be stainless in accord with ASTM B136.

FINISHES:

Exposed aluminum components to which exterior sealant is applied:

Two-coat, shop-applied, baked-on fluoropolymer coating system based on Pennwalt Corp. Kynar 500 resin (polyvinylidene fluoride, PVDF), formulated by a Pennwalt licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 605.2-85.

Coating system shall provide minimum 1.2 mil dry film thickness consisting of 0.3 (+/-0.1) mil primer and minimum 1.0 mil color coat.

Color: Color as selected by Architect from manufacturers full range of colors.

FRAMING:

Fixed Window Units: Glass framing members shall provide for flush glazing on all sides with through site lines, and no projecting stops or face joints. The system shall provide fully resilient settings for glass. Adapters and mountings, trim molding, and face materials shall be designed so as to permit the installation of these products in their regular manner, and shall not interfere with the normal assembly and weathering of the grid framing. System shall be self-draining and shall include manufacturer's flashing. Window and frame assemblies shall restrict air infiltration to 0.5 CFM/LF of sash crack.

Provide .040 brake metal sills to match finish of framing and formed to shape as shown on the drawings.

PART 3 - EXECUTIONPREPARATION:

Field Measurement: Where possible, take field measurements prior to preparation of shop drawings and fabrication, to ensure proper fitting of work. However, proceed with fabrication and coordinate installation tolerances as necessary when field measurements might delay work.

INSTALLATION:

Set units plumb, level, and true to line, without warp or rack of framing members, doors, or panels. Anchor securely in place, separating aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

Set sill members and other members in bed of sealant as indicated, or with joint fillers or gaskets as indicated to provide weathertight construction. Comply with requirements of Division 7 for sealants, fillers, and gaskets.

Refer to "Glass and Glazing" section of Division 8 for installation of glass and other panels shown to be glazed into doors and framing, and not preglazed by manufacturer. Glazing gaskets shall be extruded EPDM rubber.

CLEANING:

Clean completed system, inside and out, promptly after erection and installation of glass and sealants. Remove excess glazing and sealants, dirt, and other substances from aluminum surfaces.

Institute protective measures and other precautions required to assure that aluminum entrance will be without damage or deterioration, other than normal weathering, at time of acceptance.

End of Section 084100

SECTION 084150 - ALUMINUM-FRAMED ENTRANCESPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

RELATED SECTIONS:

Section 079000 Joint Sealers
Section 084100 Aluminum Storefront Work
Section 087100 Hardware
Section 088000 Glazing
Division 16 Section "Electrical" for conduits required at exterior door frames.

ENTRANCE PERFORMANCE REQUIREMENTS:

Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position, the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 6.24 psf for single doors and 1.567 psf for pair of doors. A single 3'0" x 7'0" (915 x 2134) entrance door and frame shall not exceed 0.50 cfm per square foot. A pair of 6'0" x 7'0" (1830 x 2134) entrance doors and frame shall not exceed 1.0 cfm per square foot.

Structural: Corner strength shall be tested per the manufacturer's load test procedure and certified by an independent testing laboratory to ensure weld compliance and corner integrity.

Thermal Performance: Computer simulation testing shall be in accordance with NFRC 100/200/500 and AAMA 507-03.

SUBMITTALS:

Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.

Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.

Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

Include details of provisions for system expansion and contraction and for draining moisture occurring within the system to the exterior.

Submit actual finish samples for finish color selection.

Submit certified test reports showing compliance with specified performance characteristics.

WARRANTY:

Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.

Failures include, but are not limited to, the following:

- a. Structural failures including, but not limited to, excessive deflection.
- b. Noise or vibration caused by thermal movements.
- c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- d. Water leakage through fixed glazing and framing areas.
- e. Failure of operating components to function properly.

Warranty Period: Five (5) years from date of Substantial Completion.

Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.

Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
- b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
- c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

Finish Warranty Period: Twenty (20) years from date of Substantial Completion.

QUALITY ASSURANCE:

Source Limitations: Obtain aluminum framed storefront system through one source from a single manufacturer. Aluminum Framed Storefront and Aluminum Framed Entrances shall be obtained from the same single source manufacturer.

Installer Qualifications: Capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.

Engineering Responsibility: Preparation of data for aluminum-framed systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.

The General Contractor shall use a door hardware installer factory trained to install and adjust the door hardware products specified in section 08710, including locksets, exit devices, door closers, overhead stops and holders, in accordance with the respective manufacturer's instructions. The door hardware installer shall provide a copy of certification document to the General Contractor.

All door hardware shall be installed with factory supplied fasteners. All exit devices, door closers and overhead stops are to be installed with thru bolts.

Manufacturer Qualifications: Manufacturer capable of providing structural calculations, applicable independent product test reports, installation instructions, a review of the application method, customer approval and periodic field service representation during construction.

Pre-construction Coordination Meeting: The General Contractor shall set up and attend a pre-construction coordination meeting with the Owner, door hardware supplier, door and frame supplier, electrical and security contractors to coordinate the installation of all electrical hardware items and conduit. Hardware supplier shall provide riser diagrams, wiring diagrams and operational descriptions as required by the General and sub-contractors.

Pre-installation Conference: The General Contractor shall schedule a pre-installation conference with the Contractor's installer, a representative of the county planning and maintenance department, and a representative of the hardware distributor, to demonstrate product installation and adjustment in accordance with manufacturer's recommendations and Owner's requirements. The electrician, access control supplier, electrical engineer, and a representative of Cobb County Maintenance and Operations shall attend this conference.

Provide aluminum entrances specified herein from a single source. When aluminum entrances are part of a building enclosure system, including storefront framing, windows, curtain wall system and related products, provide building enclosure system products from a single source manufacturer.

Fabrication Tolerances: Fabricate aluminum entrances in accordance with entrance manufacturer's prescribed tolerances.

DELIVERY, STORAGE AND HANDLING:

Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

Store materials protected from exposure to harmful weather conditions. Handle entrance doors and components to avoid damage. Protect entrance doors against damage from elements, construction activities, and other hazards before, during and after entrance installation.

PART 2 - PRODUCTS

Basis of design: Kawneer Company, Inc., Insulclad 500

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include the following:

Kawneer Company, Inc.,
EFCO Corporation
YKK APP America, Inc.
Tubelite

MATERIALS:

Material Standard: ASTM B 221; 6063-T6 alloy and temper.

The entrance door stile and rail face dimensions shall be as follows:

<u>Door</u>	<u>Vertical Stile</u>	<u>Top Rail</u>	<u>Mid Rail</u>	<u>Bottom Rail</u>
500	5"	8"	8"	10"

Major portions of the door members to be 0.125" (3.2) nominal in thickness and glazing molding shall be 0.05" (1.3) thick.

Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.

Provide adjustable glass jacks to help center the glass in the door opening.

ACCESSORIES:

Fasteners: Where exposed, shall be aluminum, stainless steel or plated steel.

Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.

Weather Stripping: Manufacturer's standard replaceable components.

Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

Entrance Hardware: See Section 087100, Finish Hardware.

FABRICATION:

Entrance System Fabrication: Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1-1/2" (28.6) long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord. Exposed portions of door cladding moldings shall be 3/32" (2.4) thick. Aluminum cladding shall be interlocked with PVC separators and applied with VHB acrylic foam tape. There shall be no metal to metal contact, direct or indirect, between the cladding or the cladding attachments and the door structure.

Accurately fit and secure joints and corners. Make joints hairline in appearance.

Prepare components with internal reinforcement for door hardware.

Arrange fasteners and attachments to conceal from view.

FINISHES:

2-Coat Floropolymer (70% PVDF), AAMA 2605, Fluoropolymer Coating.

Color as selected by Architect from Manufacturer's standard fluoropolymer colors.

PART 3 - EXECUTIONEXAMINATION:

Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive entrance system and sill plate is level in accordance with manufacturer's acceptable tolerances.

INSTALLATION:

General: Install entrance system in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual.

Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities. Provide alignment attachments and shims to permanently fasten system to building structure. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.

Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:

Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet, 1/4 inch over total length.

Alignment:

Where surfaces abut in line, limit offset from true alignment to 1/16 inch.

Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.

Diagonal Measurements: Limit difference between diagonal measurement to 1/8 inch .

Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.

Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

Set continuous sill members and flashing in full sealant bed as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.

Install perimeter joint sealants as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.

Set thresholds in bed of mastic and secure. Adjust operating hardware for smooth operation.

CLEANING AND PROTECTION:

Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

Protect installed product's finish surfaces from damage during construction. Protect aluminum entrances from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants. Remove and replace damaged aluminum entrances.

End of Section 084150

SECTION 084400 - FIRE-RATED GLAZED STEEL CURTAIN WALLPART 1 - GENERALSECTION INCLUDES

Exterior fire-rated insulated curtain wall systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of curtain wall framing.

RELATED SECTIONS

Section 055000 - Metal Fabrications: Steel attachment members inserts and anchors.

Section 076000 - Sheet Metal Flashing and Trim: Flashing between the curtain wall and adjoining construction.

REFERENCES

ASTM International (ASTM):

- ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.
- ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- ASTM A 570/A 570M - Standard Specification for Pipe, Steel, Electric-Fusion (Arc)-Welded (Sizes NPS 16 and Over).
- ASTM A 611 - Standard Specification for Structural Steel (SS), Sheet, Carbon, Cold-Rolled.
- ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
- ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
- ASTM E 283 - Test Method for Determining the Rate of Airflow through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen.
- ASTM E 119 - Methods for Fire Tests of Building Construction and Materials.
- ASTM E 330 - Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- ASTM E 331 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

American Architectural Manufacturers Association (AAMA):

- AAMA 501.1 - Standard Test Method for Water Penetration of Windows, Curtain Walls, and Doors Using Dynamic Pressure.
- AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.

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- AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

American Welding Society (AWS):

AWS D1.3 - Structural Welding Code - Sheet Steel.

Canadian Standards:

CAN4-S106-M - Standard Method for Fire Tests of Window and Glass Block Assemblies.

National Fire Protection Association (NFPA):

NFPA 251 - Fire Tests of Building Construction & Materials.

Underwriters Laboratories, Inc. (UL):

UL 263 - Fire tests of Building Construction and Materials.

UL-752 - Ratings of Bullet-Resistant Materials.

American National Standards Institute (ANSI):

ANSI Z97.1 - Standard for Safety Glazing Materials Used in Buildings.

Consumer Product Safety Commission (CPSC):

CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

SUBMITTALS

Submit under provisions of Section 013110 - Submittals.

Product Data: Manufacturer's data sheets on each product to be used, including:

- Preparation instructions and recommendations.
- Storage and handling requirements and recommendations.
- Installation methods.

Shop Drawings:

Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.

Submit shop drawings indicating materials, construction, dimensions, accessories, and installation details.

Provide templates for the location of embeds and anchor locations required at adjoining work.

Engineering: Prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of steel fire-rated glazed curtain-wall systems.

Include structural analysis data signed and sealed by a qualified professional engineer responsible for their preparation. Engineer shall be licensed in the state of Georgia.

Selection Samples: For each glass and finish product specified, two complete sets of glass samples and color chips representing manufacturer's full range of available colors and patterns.

Verification Samples: For each glass construction and finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

Installer Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

Field Quality-Control Reports: Written reports from field quality control activities.

Maintenance Data: Manufacturer's maintenance information.

Warranties: Submit manufacturer's warranty and ensure that forms have been completed in the Owner's name and registered with the manufacturer.

PERFORMANCE REQUIREMENTS

Fire Rating Requirements: As specified or scheduled.

Structural Performance:

Wind loads: Provide system; include anchorage, capable of withstanding wind load design pressures per the components and cladding schedule shown on the Structural Drawings.

Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/sq. ft. (0.3 l/(s x m²)) at a static air pressure differential of 6.27 psf.

Water Resistance, Static: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a static air pressure differential of 15 psf as defined in AAMA 501.

Water Resistance, Dynamic: The test specimen shall be tested in accordance with AAMA 501.1. There shall be no leakage at an air pressure differential of 15 psf as defined in AAMA 501.

Uniform Load: A static air design load of 50 psf (2394 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member at design load. At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2 percent of their clear spans shall occur.

QUALITY ASSURANCE

Manufacturer Qualifications:

Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.

Manufacturer shall have five years experience manufacturing and fabricating products of similar type and scope as those specified in this section.

Installer Qualifications: Installer experienced to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.

Engineering Responsibility: Preparation of data for glazed curtain-wall systems including the following:

Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.

Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

Certification: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

Wall assemblies shall be tested to the acceptance criteria of ASTM E 119, NFPA 251, UL 263 Standard Test Methods for Fire Tests of Building Construction and Materials.

Impact Safety Resistance: CPSC 16, CFR1201 (Cat. I and II).

Listings and Labels, Fire Rated Assemblies: Under current follow-up service by an approved independent agency maintaining a current listing or certification. Label assemblies in accordance with limits of manufacturer's listing.

Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

DELIVERY, STORAGE, AND HANDLING

Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle material and components to avoid damage. Protect curtainwall material against damage from elements, construction activities, and other hazards before, during and after curtainwall installation.

Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

PROJECT CONDITIONS

Field Measurements: Verify actual locations of structural supports for steel fire-rated glazed curtain-wall systems by field measurements before fabrication and indicate measurements on Shop Drawings.

Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating steel fire-rated glazed curtain-wall systems without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

WARRANTY

Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of steel fire-rated glazed curtain-wall systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.

Failures include, but are not limited to, the following:

- Structural failures including, but not limited to, excessive deflection.
- Noise or vibration caused by thermal movements.
- Deterioration of metal finishes beyond normal weathering.
- Deterioration of metals and other materials beyond normal weathering.
- Water leakage.
- Failure of operating components to function normally.

Warranty Period: Five years from date of Substantial Completion.

Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.

Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

MANUFACTURERS

Acceptable Manufacturer: Vetrotech - Fire-Rated Glass & Systems, which is located at: 2108 B St. N. W. Suite 110; Auburn, WA 98001; Toll Free Tel: 888-803-9533; Tel: 253-333-0660; Fax: 253-333-5166; Email: [request info \(vetrotech.sales@saint-gobain.com\)](mailto:request info (vetrotech.sales@saint-gobain.com)); Web: www.vetrotechusa.com

Equal products manufactured by Safti First and Technical Glass products are acceptable.

SYSTEM DESCRIPTION

Steel Fire-Rated Glazed Insulated Curtain Wall System, Outside Glazed Pressure Plate and Cover Cap.

- Product: VDS Curtain Wall Series fire-rated steel frame system as supplied by Vetrotech Saint-Gobain North America, Inc.
- Fire Rating: 60 minute (VDS 60).
- Glass Position: Center.
- Face Width: 2-3/8 inches (60 mm) wide.
- Water Drainage: System is vertically weeped. No joint plugs or weep holes at horizontal mullions. Horizontal gaskets are notched and received by vertical gaskets.

Glazing:

- Product: "CONTRAFLAM IGU" fire-rated glazing as manufactured and distributed by Vetrotech Saint-Gobain North America, Inc.
- Fire Rating 60 minutes
- Outboard lite to be equal to ¼" Clear Solar Ban 60

STEEL FRAMING

Steel Curtainwall Framing System:

- Steel Frame: Profiled steel tubing permanently joined with steel bolts.
- Frame shall meet Bullet Resistance rating Level III per UL 752.
- Steel Pressure Plates: Formed stainless steel pressure plate with dimensions recommended by manufacturer to securely hold glazing material in place.
- Cover Caps: Extruded Aluminum.
- Insulation: Insulate framing system against effects of fire, smoke, and heat transfer from either side. Insulate profiled steel tubing using a shell construction that incorporates PROMATECT intermediate interlayer. Firmly pack perimeter of framing system to rough opening with mineral wool fire stop insulation or appropriately rated intumescent sealant.
- Steel Glazing Beads: Extruded steel beads with dimensions recommended by manufacturer to securely hold glazing material in place.
- Fasteners: Type recommended by manufacturer.
- Glazing Accessories: Set CONTRAFLAM glass using calcium silicate, or setting blocks.
- Glaze CONTRAFLAM glass with glazing gaskets, compounds and tapes with the following:
 - a. Manufacturer approved EPDM glazing gaskets.
 - b. Manufacturer approved closed cell PVC tape.
 - c. Manufacturer approved pure silicone sealant.

Fabrication:

- Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- Accurately fit and secure joints and corners. Make joints flush and weatherproof.

- Prepare components to receive anchor devices.
- Fabricate anchors.
- Arrange fasteners and attachments to be concealed from view.

Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221.

Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

- Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
- Cold-Rolled Sheet and Strip: ASTM A 611.
- Hot-Rolled Sheet and Strip: ASTM A 570/A 570M.

Brackets and Reinforcements: Manufacturer's standard high-strength materials with nonstaining, nonferrous shims for aligning system components.

Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

- Where fasteners are subject to loosening or turn out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
- Reinforce members as required to receive fastener threads.

Exposed Fasteners: Use fasteners fabricated from Type 316 stainless steel.

Anchors: Three-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

FINISHES, GENERAL

Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable. Noticeable variations in the same piece are not acceptable.

INTERIOR STEEL FINISHES

Color-Coated Finish: Apply manufacturer's standard powder coating finish system applied to factory-assembled frames before shipping, complying with manufacturer's written instructions for surface preparation including pretreatment, application, and minimum dry film thickness.

Color and Gloss: As selected by Architect from manufacturer's full range.

ALUMINUM FINISHES

Aluminum Finishes: Provide the following finish for interior and exterior exposed aluminum surfaces:
Color Anodic Coating, Class 1: MM10C22A44 dark bronze coating electrolytically deposited; complying with AAMA 611-98, 0.7 mil minimum thickness.

GLAZING

Glass:

Properties:

- Thickness: 2"
- Weight: Varies with thickness. Range 10 to 24 lbs. / sq. ft. (50 to 120 kg/sq. m).
- Approx. visible light transmission: Varies with thickness. Range 85 to 70 percent).
- Fire Rating: As specified or scheduled.
- Impact Safety Rating: ANSI Z97.1 and CPSC 16CFR1202 (Cat I & II).

Labeling: Permanently label each lite of CONTRAFLAM with laboratory logo (WHI and/or UL), product and manufacturer's name, rating, and safety specifications.

Fire Rating: Fire-rating listed and tested by Intertek Testing (WHI) for fire rating scheduled at opening locations in drawings.

Fabricate glass and other glazing products in sizes required to glaze openings indicated for project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standards as required to comply with system performance requirements.

ACCESSORIES

Glazing Gaskets:

- Exterior Applications: ASTM C 864; silicone compatible, extruded EPDM rubber that provides for silicone adhesion.
- Interior Applications: Approved closed cell PVC tape.
- Interior Applications: Approved pure silicone sealant.

Intumescent Tape: As supplied by frame manufacturer.

Setting Blocks: Calcium silicate.

Perimeter Anchors: Steel and stainless steel alloy where exposed.

Flashings: As recommended by manufacturer; same material and finish as cover caps.

Silicone Sealant: One-Part Low Modulus, High Movement-Capable Sealant: Type S; Grade NS; Class 25 with additional movement capability of 100 percent in extension and 50 percent in compression (total 150 percent); Use (Exposure) NT; Uses (Substrates) M, G, A, and O as applicable. Provide "O" rated material for joint substrates of metal factory-coated with a high-performance coating, galvanized steel and ceramic tile.

Approved Product:

Dow Corning 790 - Dow Corning Corp.

Intumescent Caulk: Single component, latex-based, intumescent caulk designed to stop passage of fire, smoke, and fumes through fire-rated separations; permanently flexible after cure; will not support mold growth; flame spread/smoke developed 10/10.

Approved Product:

Firetemp CI - John-Manville.

PART 3 - EXECUTION

EXAMINATION

Do not begin installation until substrates have been properly prepared.

If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

Examine glass and framing, with glazier present, for compliance with the following:

- Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
- Minimum required face or edge clearances
- Observable edge damage or face imperfections.

Do not proceed with glazing until unsatisfactory conditions have been corrected.

Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

PREPARATION

Clean surfaces thoroughly prior to installation.

Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

FRAME INSTALLATION

Install in accordance with manufacturer's instructions.

GLASS INSTALLATION

Install in accordance with manufacturer's instructions.

Comply with FGMA glazing manual and instructions of manufacturers of glass, glazing sealants, and glazing compounds.

Protect glass from edge damage during installation and handling. Inspect glass during installation and set aside pieces with edge damage that could affect performance.

Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.

Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.

Place setting blocks located at quarter points of glass with edge block no more than 8 inches from corner.

Glaze vertically into labeled doors or frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit.

Place glazing tape in free perimeter of glazing in same manner as described above.

Do not remove protective edge tape.

Maintain edge clearance.

Install removable stop and secure without displacing tape or glazing compound.

Knife trim protruding tape.

Apply cap bead of silicone sealant along void between glass stop and glazing, to uniform line, with bevel to form watershed away from glass. Tool or wipe surface smooth.

Do not pressure glaze.

Install so that appropriate markings remain visible.

PROTECTION

Protect installed products until completion of project.

Touch-up, repair or replace damaged products before Substantial Completion.

Protect glass from contact with contaminating substances resulting from construction operations. Remove such substances by method approved by manufacturer.

Wash glass on both faces not more than four days prior to date scheduled for inspections intended to establish date of substantial completion. Wash glass by method recommended by glass manufacturer.

END OF SECTION 084400

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Other doors to the extent indicated.

- B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.

- C. Related Sections:

1. Division 08 Section "Hollow Metal Doors and Frames".
2. Division 08 Section "Flush Wood Doors".
3. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
4. Division ~~28~~ 27 Section "Access Control".

- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
 - 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Wiring instructions for each electronic component scheduled herein.
 - 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
 - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
 2. Plans for existing and future key system expansion.
 3. Requirements for key control storage and software.
 4. Installation of permanent keys, cylinder cores and software.
 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Five years for exit hardware.
 - 2. Twenty five years for manual overhead door closer bodies.
 - 3. Five years for motorized electric latch retraction exit devices.
 - 4. Two years for electromechanical door hardware, unless noted otherwise.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

- a. ~~Two Hinges: For doors with heights up to 60 inches.~~
- b. Three Hinges: For doors with heights 61 to 90 inches.
- c. Four Hinges: For doors with heights 91 to 120 inches. ~~For doors with width greater than 36 inches.~~
- d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

- a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
- b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

- a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
- b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

- a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

- a. ~~McKinney Products; (MK).~~
- b. Stanley Hardware (ST).

- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

- a. Pemko Products; (PE).
- b. No Substitution.

2.3 POWER SUPPLY

A. Power supplies shall be provided with the following:

1. Power supplies and distribution shall be UL listed.
2. Dual voltage 12 or 24 VDC field selectable continuous output.
3. Tolerates brownout or overvoltage input $\pm 15\%$ of nominal voltage.
4. Thermal shutdown protection against overcurrent and reverse battery faults.
5. Integrated battery charging circuit prevents overvoltage on locking devices.
6. Lifetime replacement, no fault warranty.

B. Specification Data:

1. Power supply outputs are Class 2 power limited when used with 4, 8 or 16 output distribution boards.
2. Expandable up to 16 independently controlled power limited outputs.
3. LED indicators and form "C" contacts for supervision.
4. Supports up to two (2) sealed gel, AGM or wet lead acid batteries.
5. Dimensions: 14" x 14" x 4-3/4" enclosure.
6. Operating Temp: -4 to +122F [-20 to +50C].

C. Manufacturers:

1. Securitron Model: AQDI

2.4 POWER TRANSFER DEVICES

A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets with a 1-year warranty. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

- a. McKinney Products; (MK) - QC (# wires) Option.
- b. No Substitution.

B. Electrified Quick Connect Continuous Geared Transfer Hinges: Provide electrified transfer continuous geared hinges with a removable service panel cutout accessible without de-mounting door from the frame. Furnish with Molex™ standardized plug connectors with sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:
 - a. Pemko Products; (PE) - SER-QC (# wires) Option.
 - b. No Substitution.

C. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:
 - a. McKinney Products; (MK) - Electrical Connecting Kit: QC-R001.
 - b. McKinney Products; (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - QC-C Series.
 - b. No Substitution.

2.5 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:
 - a. Door Controls International (DC).
 - b. Rockwood Products; (RO).

B. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

3. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; (RO).

2.6 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
 1. Manufacturers:
 - a. Schlage (SC) Match Existing
 - b. No Substitution.
- C. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 1. Threaded mortise cylinders with rings and cams to suit hardware application.
 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 4. Tubular deadlocks and other auxiliary locks.
 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 6. Keyway: Manufacturer's Standard.Match Facility Standard.
- D. Keying System: Each type of lock and cylinders to be factory keyed.
 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:
 1. Change Keys per Cylinder: Two (2)
 2. Master Keys (per Master Key Level/Group): Five (5).
 3. Construction Keys (where required): Ten (10).
- F. Construction Keying: Provide construction master keyed cylinders.
- G. Key Registration List (Bitting List):
 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.7 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.
1. Locks shall meet or exceed the requirements of ANSI/BHMA A156.2 Series 4000, Grade 1 with all standard trims, as follows:
 - a. Cycle Test: ANSI/BHMA A156.2 Grade 1 requirements with no lever sag.
 - b. Abusive Locked Lever Torque: Exceed 3,100 in-lb with no entry; lock to maintain egress functionality in compliance with BHMA certification requirements.
 - c. Offset Lever Pull: Exceed 1,600 lbs with no entry (8 times ANSI/BHMA A156.2 requirements).
 - d. Latch Retraction with Preload: Exceed 100 lb preload while maintaining ANSI/BHMA requirements for operation in warped doors (2 times ANSI/BHMA A156.2 requirements).
 2. Vertical Impact: Exceed 100 vertical impacts (20 times ANSI/BHMA A156.2 requirements).
 3. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
 4. Locks are to be non-handed and fully field reversible.
 5. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.2 requirements to 9 million cycles.
 6. Manufacturers:
 - a. Sargent Manufacturing (SA) - 10X Line.
 - b. No Substitution.

2.8 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 2. Strikes for Bored Locks and Latches: BHMA A156.2.

3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.9 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
 7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 9. Extended cycle test: Devices to have been cycle tested 50 million cycles.
 10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 80 Series.
 - b. No Substitution.

C. Conventional Push Rail Exit Devices (Light Commercial Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Formed steel mounting rail construction, with steel or plastic covers, designed for economical commercial applications. Devices available for both rim and surface vertical rod applications.

1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 20 Series.

2.10 ELECTROMECHANICAL EXIT DEVICES

A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.

1. Energy Efficient Design: Provide devices which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
2. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.
3. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
4. Manufacturers:
 - a. Sargent Manufacturing (SA) - 80 Series.
 - b. No Substitution.

2.11 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Manufacturers:
 - a. Norton Door Controls (NO) - 7500 Series.
 - b. Sargent Manufacturing (SA) - 351 Series.
 - c. Yale Commercial(YA) - 4400 Series.

2.12 SURFACE MOUNTED CLOSER HOLDERS

- A. Electromagnetic Door Holders: Certified ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate 12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.
1. Manufacturers:
 - a. Rixson (RF) - 980/990 Series.
 - b. Sargent Manufacturing (SA) - 1560 Series.

2.13 ARCHITECTURAL TRIM

- A. Door Protective Trim
1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than

1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.14 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
 1. Manufacturers:
 - a. Rixson Door Controls (RF).
 - b. Sargent Manufacturing (SA).

2.15 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
 - 2. Reese Enterprises, Inc. (RE).

2.16 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.17 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
 - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. OT - Other
3. PE - Pemko
4. RO - Rockwood
5. SA - SARGENT
6. YA - Yale
7. RF - Rixson
8. SU - Securitron
9. HD - HID

HARDWARE SCHEDULE

Door #	Hdw Set	New Hdw Set
101	2.0	1.0
102	1.0	2.0
103	3.0	
104	3.0	
105	4.0	
106	3.0	
107	3.0	
108	8.0	
109	9.0	
110	8.0	
111	10.0	
111A	8.0	
112	13.0	11.0
113	13.0	11.0
114	19.0	
115	19.0	
116	13.0	11.0
117	10.0	
118	13.0	11.0
119	13.0	11.0
120	13.0	11.0
121	13.0	11.0
122	13.0	11.0
123	21.0	
124	21.0	
125	13.0	11.0
126	21.0	
127	13.0	11.0
128	13.0	11.0
129	21.0	
130	13.0	11.0
131	13.0	11.0
132	21.0	
133	21.0	

Door #	Hdw Set	New Hdw Set
134	13.0	11.0
135	13.0	11.0
136	21.0	
137	10.0	
138	13.0	11.0
139	7.0	
140	20.0	
141	12.0	
142	22.0	
143	22.0	
144	12.0	
145	15.0	
146	15.0	
201	10.0	
202	14.0	
203	14.0	
204	14.0	
205	13.0	
206	13.0	
207	13.0	11.0
208	13.0	11.0
209	20.0	
210	20.0	
211	18.0	
212	18.0	
213	16.0	
214	16.0	
215	14.0	
216	14.0	
217	14.0	
218	14.0	
219	13.0	
220	13.0	
221	14.0	

Door #	Hdw Set	New Hdw Set
222	13.0	11.0
223	13.0	11.0
224	5.0	
225	11.0	
226	17.0	
227	20.0	
228	6.0	
229	13.0	11.0
230	13.0	
231	11.0	
232	19.0	
233	19.0	
234	21.0	
235	20.0	
236	21.0	
237	21.0	
238	13.0	11.0
239	10.0	
301	8.0	
302	8.0	
E01	27.0	
E02	27.0	
E03	27.0	
E04	26.0	
E05	27.0	
E06	25.0	
T01	24.0	
T02	23.0	
T03	23.0	

Hardware Sets

Set: 1.0

Doors: 101 402

Description: Exterior Aluminum Card Access Exit Pair

2 Continuous Hinge	CFM__HD1 x Door Height		PE
2 Continuous Hinge	CFM__HD1 SER12 x Door Height		PE
1 Mullion	L980A	US28	SA
1 Rim Exit Device, Dummy	16 21 8810 FLW	US32D	SA
1 Rim Exit Device, Storeroom	21 55 56 8804 FLW GMK	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	TB 351 CPS 581-2	EN	SA
2 Door Stop (floor)	467-RKW	Black	RO
2 Wall Stop (bollard mtd)	400	US26D	RO
1 Threshold	171AK x Opening Width		PE
1 Mullion Gasketing	5110BL		PE
2 Sweep	315CN x Door Width		PE
1 ElectroLynx Harness	QC-C012		MK
1 ElectroLynx Harness	QC-C2500P		MK
1 Position Switch	DPS-M-GY by Div 27 Subcontractor		SU
1 Mullion Card Reader	SE RP10 by Div 27 Subcontractor	Blk	HD
1 Power Supply	AQD1		SU

Notes: Perimeter gasket by frame manufacturer.

Video / Intercom system by others.

Furnish door stops as required for bollard or floor mounting.

Door contact switch indicates propped door condition.

Access control panel and security software by security contractor.

Prep door and hinge jamb for electromechanical device.

OPERATION: Card reader outside temporarily retracts latchbolt - auto relock.

Device is fail-secure with inside RX switch and outside key override. Inside pushbar always allows egress.

Set: 2.0

Doors: 101 402

Description: Exterior Aluminum Nightlatch Function Exit Pair

2 Continuous Hinge	CFM__HD1 x Door Height		PE
2 Continuous Hinge	CFM__HD1 SER12 x Door Height		PE
1 Mullion	L980A	US28	SA
1 Rim Exit Device, Storeroom	16 21 8804 FLW GMK	US32D	SA
1 Rim Exit Device, Dummy	16 21 8810 FLW	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	TB 351 CPS 581-2	EN	SA
2 Door Stop (floor)	467-RKW	Black	RO
2 Wall Stop (bollard mtd)	400	US26D	RO
1 Threshold	171AK x Opening Width		PE
1 Mullion Gasketing	5110BL		PE
2 Sweep	315CN x Door Width		PE
1 Position Switch	DPS-M-GY by Div 27 Subcontractor		SU

Notes: Perimeter gasket by frame manufacturer.
Furnish door stops as required for bollard or floor mounting.
Door contact switch indicates propped door condition.

Set: 3.0

Doors: 103, 104, 106, 107

Description: Exterior Card Access Exit Pair

5 Hinge, Full Mortise, Hvy Wt	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK
1 Hinge, Full Mortise, Hvy Wt	T4A3386 QC12 4-1/2" x 4-1/2"	US32D	MK
1 Mullion	L980S	PC	SA
1 Rim Exit Device, Dummy	16 21 8810 FLW	US32D	SA
1 Rim Exit Device, Storeroom	21 55 56 8804 FLW GMK	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	351 CPS	EN	SA
2 Door Stop (floor) @107	467-RKW	Black	RO
2 Wall Stop (bollard mtd) @103, 104, 106	400	US26D	RO
1 Threshold	171AK x Opening Width		PE
1 Mullion Gasketing	5110BL		PE
1 Perimeter Gasketing	2891AS x Head & Jambs		PE
2 Sweep	315CN x Door Width		PE
1 ElectroLynx Harness	QC-C012		MK
1 ElectroLynx Harness	QC-C2500P		MK
2 Position Switch	DPS-M-GY by Div 28 Subcontractor		SU
1 Mullion Card Reader	SE-RP10 by Div 28 Subcontractor	Blk	HD
1 Power Supply	AQD as Required by Div 28 Sub		SU
1 Future Access Control	prep and run wire for future access control		OT

Notes: ~~Door contact switch indicates propped door condition.~~

Furnish door stops as required for bollard or floor mounting.

~~Access control panel and security software by security contractor.~~

Prep door and hinge jamb for electromechanical device.

~~OPERATION: Card reader outside temporarily retracts latchbolt— auto relock.~~

~~Device is fail-secure with inside RX switch and outside key override. Inside pushbar always allows egress.~~

Floor stop @ 107

Wall stop @ 103, 104, 106

Set: 4.0

Doors: 105

Description: Exterior Aluminum Nightlatch Function Exit Pair

5 Hinge, Full Mortise, Hvy Wt	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK
1 Hinge, Full Mortise, Hvy Wt	T4A3386 QC12 4-1/2" x 4-1/2"	US32D	MK
1 Mullion	L980S	PC	SA
1 Rim Exit Device, Storeroom	16 21 8804 FLW GMK	US32D	SA
1 Rim Exit Device, Dummy	16 21 8810 FLW	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	351 CPS	EN	SA
2 Door Stop (floor)	467-RKW	Black	RO
2 Wall Stop (bollard mtd)	400	US26D	RO
1 Threshold	171AK x Opening Width		PE
1 Mullion Gasketing	5110BL		PE
1 Perimeter Gasketing	2891AS x Head & Jambs		PE
2 Sweep	315CN x Door Width		PE
2 Position Switch	DPS-M-GY by Div 27 Subcontractor		SU

Notes: Door contact switch indicates propped door condition.
Furnish door stops as required for bollard or floor mounting.

Set: 5.0

Doors: 224

Description: Classroom Function Exit - Smoke Door

3 Hinge, Full Mortise, Hvy Wt	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Rim Exit Device, Classroom	LD 21 8813 ETL GMK	US32D	SA
1 Surface Closer	TB 351 P10	EN	SA
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
4 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE

Set: 6.0

Doors: 228

Description: Classroom Function Exit Pair - Smoke Door

6 Hinge, Full Mortise, Hvy Wt	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Mullion	L980S	PC	SA
1 Rim Exit Device, Classroom	LD 21 8813 ETL GMK	US32D	SA
1 Rim Exit Device, Exit Only	LD 8810 EO	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	TB 351 P10	EN	SA
2 Kick Plate	K1050 10" High	US32D	RO
2 Wall Stop	406	US32D	RO
1 Mullion Gasketing	5110BL		PE
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE

Set: 7.0

Doors: 139

Description: Classroom Function Exit Pair + Sound Seals

6 Hinge, Full Mortise, Hvy Wt	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Mullion	L980S	PC	SA
1 Rim Exit Device, Classroom	LD 21 8813 ETL GMK	US32D	SA
1 Rim Exit Device, Exit Only	LD 8810 EO	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	TB 351 P10	EN	SA
2 Kick Plate	K1050 10" High	US32D	RO
2 Wall Stop	406	US32D	RO
1 Mullion Gasketing	5110BL		PE
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE
2 Door Bottom	4301CNBL		PE

Set: 8.0

Doors: 108, 110, 111A, 301, 302

Description: Rated Classroom Function Exit Pair + Magnetic Wall Holder

6 Hinge, Full Mortise, Hvy Wt	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Surface Vert Rod Exit, Exit Only	12 NB8710 EO	US32D	SA
1 Surface Vert Rod Exit, Classroom	12 21 NB8713 ETL GMK	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	TB 351 O	EN	SA
2 Kick Plate	K1050 10" High	US32D	RO
2 Electromagnetic Holder	998M	689	RF
1 Mullion Gasketing	5110BL 120"		PE
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Astragal - Set	18061CNB		PE

Notes: Wall magnets are tied to fire alarm system & release at smoke activation.

Set: 9.0

Doors: 109

Description: Rated Classroom Function Exit Pair

6 Hinge, Full Mortise, Hvy Wt	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Mullion	12-L980	PC	SA
1 Rim Exit Device, Exit Only	12 8810 EO	US32D	SA
1 Rim Exit Device, Classroom	12 21 8813 ETL GMK	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	TB 351 P10	EN	SA
2 Kick Plate	K1050 10" High	US32D	RO
2 Wall Stop	406	US32D	RO
1 Mullion Gasketing	5110BL		PE
1 Smoke Gasketing	S88BL x Head & Jambs		PE

Notes:

Set: 10.0

Doors: 111, 117, 137, 201, 239

Description: Rated Passage Function Exit Pair + Magnetic Wall Holders

6 Hinge, Full Mortise, Hvy Wt	T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Surface Vert Rod Exit, Passage	12 NB8715 ETL	US32D	SA
1 Surface Vert Rod Exit, Exit Only	12 NB8710 EO	US32D	SA
2 Surface Closer	TB 351 O	EN	SA
2 Kick Plate	K1050 10" High	US32D	RO
2 Electromagnetic Holder	998M	689	RF
1 Mullion Gasketing	5110BL		PE
1 Smoke Gasketing	S88BL x Head & Jambs		PE

Notes: Wall magnets are tied to fire alarm system & release at smoke activation.

Set: 11.0

Doors: 112, 113, 116, 118, 119, 120, 121, 122, 125, 127, 128, 130, 131, 134, 135, 138, 207, 208, 222, 223, 225, 229, 231, 238

Description: Classroom Function

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lock	21 10XG37 LL GMK	US26D	SA
1 Wall Stop	406	US32D	RO
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE

Set: 12.0

Doors: 141, 144

Description: Classroom Function + Sound Seals

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lock	21 10XG37 LL GMK	US26D	SA
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Door Bottom	4301CNBL 36"		PE
1 Acoustic Seal Set	PEMKOSTCSET-1A - SAR	BL	PE

Set: 13.0

Doors: 112, 113, 116, 118, 119, 120, 121, 122, 125, 127, 128, 130, 131, 134, 135, 138, 205, 206, 207, 208, 219, 220, 222, 223, 229, 230, 238

Description: Classroom Function + Closer

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lock	21 10XG37 LL GMK	US26D	SA
1 Surface Closer	TB 351 O	EN	SA
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
3 Silencer	608-RKW		RO

Notes: Furnish perimeter gaskets in lieu of silencers at fire and smoke rated openings.

Set: 14.0

Doors: 202, 203, 204, 215, 216, 217, 218, 221

Description: Rated Classroom Function + Closer

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lock	21 10XG37 LL GMK	US26D	SA
1 Surface Closer	TB 351 P10	EN	SA
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE

Set: 15.0

Doors: 145, 146

Description: Passage Function + Sound Seals

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Passage Latch	10XU15 LL	US26D	SA
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Door Bottom	4301CNBL		PE

Set: 16.0

Doors: 213, 214

Description: Privacy Function

3 Hinge, Full Mortise	TA2314 NRP 4-1/2" x 4-1/2"	US32D	MK
1 Privacy Lock	10XU65 LL	US26D	SA
1 Mop Plate	K1050 6" High	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Coat Hook	796	US26D	RO

Set: 17.0

Doors: 226

Description: Privacy Function + Closer

3 Hinge, Full Mortise	TA2314 NRP 4-1/2" x 4-1/2"	US32D	MK
1 Privacy Lock	10XU65 LL	US26D	SA
1 Surface Closer	TB 351 O	EN	SA
1 Mop Plate	K1050 6" High	US32D	RO
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Coat Hook	796	US26D	RO

Set: 18.0

Doors: 211, 212

Description: Push Plate & Pull + Closer

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Push Plate	70F	US32D	RO
1 Pull Plate	111x70C TB	US32D	RO
1 Surface Closer	TB 351 O	EN	SA
1 Mop Plate	K1050 6" High	US32D	RO
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608-RKW		RO

Set: 19.0

Doors: 114, 115, 232, 233

Description: Staff Toilet

3 Hinge, Full Mortise	TA2314 NRP 4-1/2" x 4-1/2"	US32D	MK
1 Deadbolt + Indicator	D292	626	YA
1 Entry/Office Lock	21 10XG05 LL GMK	US26D	SA
1 Surface Closer	TB 351 O	EN	SA
1 Mop Plate	K1050 6" High	US32D	RO
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE
1 Coat Hook	796	US26D	RO

Notes: Verify function with local AHJ. - Dual motion for exit requires approval.

Set: 20.0

Doors: 140, 209, 210, 227, 235

Description: Storeroom Function

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom/Closet Lock	21 10XG04 LL GMK	US26D	SA
1 Wall Stop	406	US32D	RO
3 Silencer	608-RKW		RO

Set: 21.0

Doors: 123, 124, 126, 129, 132, 133, 136, 234, 236, 237

Description: Rated Storeroom Function + Closer

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom/Closet Lock	21 10XG04 LL GMK	US26D	SA
1 Surface Closer	TB 351 O	EN	SA
1 Kick Plate	K1050 10" High	US32D	RO
1 Wall Stop	406	US32D	RO
1 Smoke Gasketing	S88BL x Head & Jambs		PE
1 Gasketing / Silencer	S88BL / 608 - as required to meet code		PE

Set: 22.0

Doors: 142, 143

Description: Storeroom Function Pair

6 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Flush Bolt	555	US26D	RO
1 Dust Proof Strike	570	US26D	RO
1 Storeroom/Closet Lock	21 10XG04 LL GMK	US26D	SA
2 Surf Overhead Hold Open	9-326	689	RF
1 Astragal	357SS x Door Height		PE
2 Silencer	608-RKW		RO

Set: 23.0

Doors: T02, T03

Description: Temporary Gate

3 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Rim Exit Device, Classroom	LD 21 8813 ETL GMK	US32D	SA
1 Surface Closer	351 P10	EN	SA
1 Wall Stop	406	US32D	RO
3 Silencer	608-RKW		RO
1 Rim Exit Device, Exit Only	2828 EO	EN	SA
1 Rim Cylinder	21 34 GMK	US15	SA
1 Gate Closer & Hinge	Tiger 180-Degree x Puma Hinge	9005	OT
3 Gate hardware	By Gate Mfg		OT

Notes: Hinges & utility pull by gate manufacturer.

Set: 24.0

Doors: T01

Description: Temporary Exit Pair

6 Hinge, Full Mortise	TA2714 NRP 4-1/2" x 4-1/2"	US26D	MK
1 Mullion	L980S	PC	SA
1 Rim Exit Device, Classroom	LD 21 8813 ETL GMK	US32D	SA
1 Rim Exit Device, Exit Only	LD 8810 EO	US32D	SA
1 Mullion Cylinder	21 980C1 GMK	US26D	SA
2 Surface Closer	351 P10	EN	SA
2 Wall Stop	406	US32D	RO
2 Silencer	608-RKW		RO

Set: 25.0

Doors: E06

Description: Existing Opening - Demo Door and Hardware

1 Demo	Remove door and hardware	OT
3 Filler Plate	DFF4	RO
1 Filler Plate	SFASA	RO

Notes: Existing frame to remain.
Install cover plates. Confirm compatibility.

Set: 26.0

Doors: E04

Description: Demo Opening

1 Demo Opening	Remove All Existing Opening Components	OT
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Set: 27.0

Doors: E01, E02, E03, E05

Description: Existing to Remain

1 Salvage Demo Hardware	Re-install hardware as required.	OT
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Notes: Existing doors and frame to remain.

END OF SECTION 087100

SECTION 088000 - GLASS AND GLAZINGPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Definitions: "Glass" includes prime glass, processed glass, and fabricated glass products. "Glazing" includes glass installation and materials use to install glass. Types of work in this section include glass and glazing for:

Entrances and other doors, not indicated as "preglazed".

Interior partitions:

"Glass products" is hereby defined to include glazing plastics.

Packaged mirror units are specified as "specialties" in another section.

QUALITY ASSURANCE:

Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.

Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.

Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.

DELIVERY, STORAGE, AND HANDLING:

Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

PROJECT CONDITIONS:

Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.

WARRANTY:

Insulated glass units shall be warranted against obstruction to vision due to film formation or dust collection on interior glass surfaces due to seal failure. Warranty period shall be ten (10) years from Date of Substantial Completion.

PART 2 - PRODUCTS

Manufacturers: Subject to compliance with requirements, provide products of one of the following:

Manufacturers of Clear and Tinted Float Glass:

AFG Industries, Inc.
Ford Glass Division.
Guardian Industries Corp.
LOF Glass, Inc.
PPG Industries, Inc.
Saint-Gobain/Euroglass.

Manufacturers of Wire Glass:

AFG Industries, Inc.
Guardian Industries Corp.
Hordis Brothers, Inc.
Pilkington Sales (North America) Limited.

Manufacturers of Heat-Treated Glass:

AFG Industries, Inc.
Cardinal IG.
Environmental Glass Products.
Falconer Glass Industries.
Ford Glass Division.
Guardian Industries Corp.
Hordis Brothers, Inc.
LOF Glass, Inc.
PPG Industries, Inc.
Safti First, Division of O'Keefe's, Inc.
Saint-Gobain/Euroglass.
Spectrum Glass Prod. Div., H. H. Robertson Co.
Technical Glass Products
Viracon, Inc.

GLASS PRODUCTS, GENERAL:

Primary Glass Standard: Provide primary glass which complies with ASTM C 1036 requirements, including those indicated by reference to type, class, quality, and, if applicable, form, finish, mesh and pattern.

PRIMARY GLASS PRODUCTS:

Polished Plate Glass: Shall be ¼" glazing quality, conforming to Federal Specification DD-G-451a, to be tempered where shown on the plans.

Tempered Glass: Shall be tempered plate, Federal Specification DD-G-00451c and shall meet the requirements of USA Standard Z-97.1-1966. Each light of tempered plate glass shall be permanently labeled by the manufacturer of the glazing material by etching, sandblasting or ceramic material fired on the glass and be visible after glazing. The label shall identify the manufacturer, thickness and type of safety glazing material, and that it meets the requirements of USA Standard Z.97-.1-1966.

Special Glass for Rated Openings: Where indicated on drawings, provide SuperLite I (20 min. use), SuperLite II-XL (45 and 60 min. use) and SuperLite I-W (90 min. use) as manufactured by Safti First to meet ratings required by openings in rated assemblies. All glass in rated openings shall have the identifying label visible in the open area of the frame. All glass in openings with rating above 20 min. shall meet "Hose Stream" test. At windows and side lites in rated walls use Super II-XL or PYRAN Platinum as necessary to obtain required rating.

Ratings shall be achieved without the use of films.

Product by TGP and VetroTech, meeting the requirements of this Specification are acceptable.

LAMINATED INBOARD GLASS (Typical Exterior New Addition Glazing):

Insulating-Glass Units: Preassembled 1" units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units.

1. Double-Glazed Sputter-Coated insulating Glass Units with Laminated Inboard Lite:
 - a. Conformance: ASTM E 2190.
 - b. Conformance: ASTM C 1172 and complying with testing requirements in CPSC 16CFR-1201 for Category II materials.
 - c. Outboard Lite: Sputter-coated clear float glass.
 - i. Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
 - ii. Tinted Float Glass: ASTM C 1036, Type 1, Class 2, Quality q3.
 - iii. Vacuum Deposition Sputtered Coating: ASTM C 1376.
 - iv. Coating on Surface No. 2: SunGuard SNX 62/27.
 - v. Glass Thickness: 6 mm (1/4 inch).
 - vi. Heat Treatment: Heat-strengthened, ASTM C 1048, Kind HS and Tempered; ASTM C 1048, Kind FT; CPSC 16CFR-1201 where required by code.
 - d. Air Space: 6 mm (1/4 inch) wide, hermetically sealed, dehydrated air space.

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- e. Inboard Laminated Glass Unit:
 - i. Conformance: ASTM C 1172, CPSC 16 CFR-1201
 - ii. Inner Lite:
 - (1) Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
 - (2) Vacuum Deposition Sputtered Coating: ASTM C 1376.
 - (3) Glass Thickness: 6 mm (1/4 inch).
 - (4) Heat Treatment: Heat-Strengthened, ASTM C 1048, Kind HS.
 - iii. Interlayer: Polyvinyl Butyral (PVB) plastic interlayer, clear, 0.060 inch thick.
 - iv. Inboard Lite
 - (1) Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
 - (2) Vacuum Deposition Sputtered Coating: ASTM C 1376.
 - (3) Glass Thickness: 6 mm (1/4 inch).
 - (4) Heat-Treatment: Heat-strengthened, ASTM C 1048, Kind HS.
- f. Glass Unit Performance Characteristics:
 - i. Visible Light Transmittance: 60 percent.
 - ii. Visible Light Reflectance Outdoors: 11 percent.
 - iii. Direct Solar Energy Transmittance: 22 percent.
 - iv. Direct Solar Energy Reflectance Outdoors: 39 percent.
 - v. Winter U-Value Nighttime: 0.28.
 - vi. Summer U-Value Daytime: 0.26.
 - vii. Shading Coefficient: 0.30.
 - viii. Solar Heat Gain Coefficient: 0.26.
 - ix. Summer Relative Heat Gain: 64 percent.
- g. Sealing System: Dual seal, approved by glass manufacturer.
 - i. VOC Content: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D.
- h. Spacer: Aluminum with mill or clear anodic finish.
- i. Desiccant: Molecular sieve or silica gel, or blend of both.
- j. Corner Construction: Manufacturer's standard.
- k. Fabricators:
 - i. Oldcastle Glass
 - ii. Trulite
 - iii. Press Glass
 - iv. AIG
 - v. Aldora

Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated on the drawings are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.

Sealing System: Dual seal, with primary and secondary sealants as follows:
Manufacturer's standard sealants.

Spacer Specifications: Manufacturer's standard spacer material and construction.

GLAZING SEALANTS AND COMPONENTS:

General: Provide color of exposed sealant/compound indicated or if not otherwise indicated, as selected by Architect from manufacturer's standard colors, or black if no color is so selected. Comply with manufacturer's recommendations for selection of hardness, depending upon the location of each application, conditions at time of installation, and performance requirements as indicated. Select materials, and variations or modifications, carefully for compatibility with surfaces contacted in the installation.

MISCELLANEOUS GLAZING MATERIALS:

Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

Setting Blocks: Neoprene or EPDM, 70-90 durometer hardness, with proven compatibility with sealants used.

PART 3 - EXECUTIONSTANDARDS AND PERFORMANCE:

Watertight and airtight installation of each glass product is required, except as otherwise shown. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.

Protect glass from edge damage during handling and installation, and subsequent operation of glazed components of the work. During installation, discard units with significant edge damage or other imperfections.

Comply with combined recommendations and technical reports by manufacturers of glass and glazing products as used in each glazing channel, and with recommendations of Flat Glass Marketing Association "Glazing Manual," except where more stringent requirements are indicated.

PREPARATION FOR GLAZING:**NO GLAZING SHALL BE STARTED UNTIL METAL FRAMES HAVE A PRIMER AND COLOR COAT, INCLUDING STOPS.**

Clean glazing channel and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrate. Remove lacquer from metal surfaces where elastomeric sealants are used. Apply primer or sealant to joint surfaces where recommended by sealant manufacturer.

GLAZING:

Install setting blocks of proper size in sill rabbet, located ¼th of glass width from each corner. Set blocks in thin course of heel-bead compound, if any.

Provide spacers inside and out, of proper size and spacing, for glass sizes larger than 50 united inches, except where gaskets or preshimmed tapes are used for glazing. Provide ⅛" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.

Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.

VOIDS and Filler Rods: Prevent exudation of sealant or compound by forming voids or installing filler rods in channel at heel of jambs and head (do not leave voids in sill channels), except as otherwise indicated and depending on light size, thickness and type of glass, and complying with manufacturer's recommendations.

Force sealants into channel to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.

Tool exposed surfaces of glazing liquids and compounds to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

Install sealants and tapes with sufficient extensibility to accommodate thermal expansion and contraction without loss of adhesion to either frame or sheet.

Clean and trim excess glazing materials from glass and stops or frames promptly after installation, and eliminate stains and discolorations.

After installation and removal of masking, protect from paint, plaster, and other splashes by taping 4 mil polyethylene to frame members.

CURE, PROTECTION AND CLEANING:

Protect exterior glass from breakage immediately upon installation, by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces. Cure sealants for high early strength and durability.

Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.

Wash and polish glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Comply with glass product manufacturer's recommendations for final cleaning.

SECTION 092550 - GYPSUM DRYWALLPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY:

Extent of each type of gypsum drywall construction require is indicated on Drawings.

This Section includes the following types of gypsum board construction:

Steel framing members to receive gypsum board.

Gypsum board screw-attached to steel framing and furring members.

Cold formed metal framing specified under other sections.

DEFINITIONS:

Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA 505 for definitions of terms for gypsum board construction not otherwise defined in this section or other referenced standards.

SUBMITTALS:

Product data from manufacturers for each type of product specified.

QUALITY ASSURANCE:

Fire-Resistance Ratings: Where indicated, provide materials and construction which are identical to those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.

Single Source Responsibility: Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.

DELIVERY, STORAGE, AND HANDLING:

Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.

Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

PROJECT CONDITIONS:

Environmental Conditions, General: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.

Minimum Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board maintain not less than 50 deg F (10 deg C) for 48 hours prior to application and continuously thereafter until drying is complete.

Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.

PART 2 - PRODUCTS

MANUFACTURERS:

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

Steel Framing and Furring:

Bostwick Steel Framing Co.

Dale Industries, Inc.

Gold Bond Building Products Div., National Gypsum Co. Incor, Inc.

Marino Industries Corp.

United States Gypsum Co.

Gypsum Boards and Related Products:

Centex American Gypsum Co.

Domtar Gypsum Co.

Georgia-Pacific Corp.

Gold Bond Building Products Div., National Gypsum Co.

United States Gypsum Co.

STEEL FRAMING FOR WALLS AND PARTITIONS:

Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 deg and doubled over to form 3/16" minimum lip (return) and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:

Depth: 3-5/8 inches, unless otherwise indicated.

Depth: 6 inches where indicated.

Steel studs in walls or furring shall be minimum 20 gauge where length of stud exceeds 8'-0", unless otherwise noted. In no case shall metal stud framing be less than 24 gauge.

STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS:

General: Provide components which comply with ASTM C 754 for materials and sizes, unless otherwise indicated.

Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper.

Channels: Cold-rolled steel, 0.0598 inch minimum thickness of base (uncoated) metal and 7/16 inch wide flanges, protected with rust-inhibitive paint, and as follows:

Carrying Channels: 1-1/2 inch deep, 475 lbs per 1000 ft., unless otherwise indicated.

Furring Channels: 3/4 inch deep, 300 lbs per 1000 ft., unless otherwise indicated.

Steel Studs for Furring Channels: ASTM C 645, with flange edges bent back 90 deg and doubled over to form 3/16 inch minimum lip (return), minimum thickness of base (uncoated) metal and minimum depth as follows:

Steel Rigid Furring Channels: ASTM C 645, hat-shaped, depth of 7/8 inch, and minimum thickness of base (uncoated) metal as follows:

Thickness: 0.0179 inch, unless otherwise indicated.

Fasteners: Provide fasteners of type, material, size, corrosion resistance, holding power and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum drywall manufacturers for applications indicated.

ALTERNATE: SUSPENSION SYSTEM:

Provide drywall grid suspension system 650C as manufactured by Chicago Metallic. Approved equal products are acceptable. Install as recommended by manufacturer.

GYP SUM BOARD:

General: Provide gypsum board of types indicated in maximum lengths available to minimize end-to-end joints.

Thickness: Provide gypsum board in thicknesses indicated, or if not otherwise indicated, in $\frac{5}{8}$ inch thicknesses to comply with ASTM C 840 for application system and support spacing indicated.

Gypsum Wallboard: ASTM C 36, and as follows:

Type: Regular, unless otherwise indicated.

Type: Type X for fire-resistance-rated assemblies.

Edges: Tapered.

Thickness: $\frac{5}{8}$ inch, unless noted otherwise.

Products: Subject to compliance with requirements, provide one of the following products where Type X gypsum wallboard is indicated:

"ProRock", Type X; Certain Teed Corp.

"Fire-Shield G"; Gold Bond Building Products Div., National Gypsum Co.

"SHEETROCK Brand FIRECODE 'C' Gypsum Panels"; United States Gypsum Co.

Products: Subject to compliance with requirements, provide one of the following products where Type X gypsum wallboard is indicated for areas from finish floor to 8'-0" AFF:

"ProRock", Abuse Resistant Type X; BPB

"Fire-Shield Hi-Abuse XP"; Gold Bond Building Products Div., National Gypsum Co.

"SHEETROCK Brand AR FIRECODE Core Gypsum Panels"; United States Gypsum Co.

For interior toilet gypsum drywall ceilings provide $\frac{5}{8}$ " thick, Type "X" core, moisture and abuse resistant gypsum board.

TRIM ACCESSORIES:

Cornerbead and Edge Trim for Interior Installation: Comply with ASTM C 840 and the following:

Cornerbead formed from zinc alloy, with flanges knurled and perforated or of fine-mesh expanded metal.

Steel Edge trim formed from galvanized steel, types per Fig. 1 of ASTM C 840 as follows:

"L" Bead where indicated.

GYPNUM BOARD JOINT TREATMENT MATERIALS:

General: Provide materials complying with ASTM C 475, ASTM C 840, and recommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.

Joint Tape: Paper reinforcing tape, unless otherwise indicated.

Drying-Type Joint Compounds: Factory-prepackaged vinyl-based products complying with the following requirements for formulation and intended use.

Ready-Mix Formulation: Factory-premixed product.

Taping compound formulated for embedding tape and for first coat over fasteners and flanges of corner beads and edge trim.

Topping compound formulated for fill (second) and finish (third) coats.

All-purpose compound formulated for use as both taping and topping compound.

MISCELLANEOUS MATERIALS:

General: Provide auxiliary materials for gypsum drywall construction which comply with referenced standards and the recommendations of the manufacturer of the gypsum board.

Gypsum Board Screws: ASTM C 1002.

PART 3 - EXECUTIONEXAMINATION:

Examine substrates to which drywall construction attaches or abuts, preset hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

PREPARATION:

Ceiling Anchorages: Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.

INSTALLATION OF STEEL FRAMING, GENERAL:

Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.

Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar construction to comply with details indicated and with recommendations of gypsum board manufacturer, or if none available, with "Gypsum Construction Handbook" published by United States Gypsum Co.

Do not bridge building expansion and control joints with steel framing or furring members; independently frame both sides of joints with framing or furring members or as indicated.

INSTALLATION OF STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS:

Secure hangers to structural support by connecting directly to structure where possible.

Do not attach hangers to metal roof deck.

Do not connect or suspend steel framing from ducts, pipes or conduit.

Keep hangers and braces 2 inches clear of ducts, pipes and conduits.

Sway-brace suspended steel framing with hangers used for support.

Install suspended steel framing components in sizes and at spacings indicated but not less than that required by referenced steel framing installation standard.

Wire Hangers: 0.1620 inch diameter (8 gauge), 4 ft. on center.

Carrying Channels (Main Runners): 1-½ inch, 4 ft. on center.

Rigid Furring Channels (Furring Members): 16 inches on center.

Rigid Furring Channels (Furring Members): 24 inches on center.

Installation Tolerances: Install steel framing components for suspended ceilings so that cross furring members or grid suspension members are level to within ⅛ inch in 12 ft. as measured both lengthwise on each member and transversely between parallel members.

Wire-tie or clip furring members to main runners and to other structural supports as indicated.

Provide drywall expansion joint for every 50 sq. ft. of ceiling and at walls that partially bisect space. Provide ⅛" joint for caulking at all perimeter walls. Caulk expansion joints prior to painting.

FIRE PROTECTION:

All steel beams and steel joists directly above fire rated walls shall be protected with appropriate layers of type "X" gypsum board (to conform to fire rating of wall).

APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL:

Gypsum Board Application and Finishing Standard: Install and finish gypsum board to comply with ASTM C 840.

Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.

Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24 inches.

Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs.

Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16 inch open space between boards. Do not force into place.

Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

Attach gypsum board to steel studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.

Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.

Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

Gypsum Sheathing: Install panels horizontally with grooved edge down, with end joints staggered over supports. Screw as recommended by the manufacturer. Provide 4 screws per 2' width at each support minimum. Seal and tape all joints.

INSTALLATION OF DRYWALL TRIM ACCESSORIES:

General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.

Install corner beads at external corners.

Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.

Install "L" bead where edge trim can only be installed after gypsum board is installed.

FINISHING OF DRYWALL:

General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.

Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.

Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.

Finish interior gypsum wallboard by applying the following joint compounds in 3 coats (not including prefill of openings in base), and sand between coats and after last coat:

Embedding and First Coat: Ready-mix drying-type all-purpose or taping compound.

Fill (Second) Coat: Ready-mix drying-type all-purpose or topping compound.

Finish (Third) Coat: Ready-mix drying-type all-purpose or topping compound.

Partial Finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing or which requires finishing to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

PROTECTION:

Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction being without damage or deterioration at time of Substantial Completion.

End of Section 092550

SECTION 093000 - TILEPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Definition: Tile includes ceramic surfacing units made from clay or other ceramic materials.

Extent of tile work is indicated on drawings and schedules.

Types of tile work in this section include the following:

Unglazed ceramic mosaic tile.

Quarry Tile

Marble thresholds and window stools.

QUALITY ASSURANCE:

Source of Materials: Provide materials obtained from one source for each type and color of tile, grout, and setting materials.

SUBMITTALS:

Samples for Verification Purposes: Submit the following:

Samples for each type of tile and for each color and texture required, not less than 12" square, on plywood or hardboard backing and grouted.

Full size samples for each type of trim, accessory and for each color.

PRODUCT HANDLING:

Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.

PROJECT CONDITIONS:

Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.

Maintain temperatures at not less than 50 deg. F (10 deg. C) in tiled areas during installation and for 7 days after completion, unless higher temperatures required by referenced installation standard or manufacturer's instructions.

PART 2 - PRODUCTSACCEPTABLE MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide products of one of the following manufacturers:

Unglazed Ceramic Mosaic Tile and Quarry Tile:

American Olean Tile Co. Div., National Gypsum Co.

Dal-Tile

Interceramic

Dry-Set Grouts:

Custom Building Products.

Ardex

Laticrete International Inc.

Mapei

Hydroment

Waterproofing Membrane:

Hydroment

Laticrete International, Inc.

Mapei Corporation

Tile Cleaners:

Hillyard Chemical Co.

L & M Surco Mfg. Co., Inc.

Ceramaseal

PRODUCTS, GENERAL:

ANSI Standard for Ceramic Tile: Comply with ANSI A137.1 "American National Standard Specifications for Ceramic Tile" for types and grades for tile indicated.

Furnish tile complying with "Standard Grade" requirements unless otherwise indicated.

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ANSI Standard for Tile Installation Materials: Comply with ANSI standard referenced with installation products and materials indicated.

Ceramic Mosaic Floor Tile: Shall be 2"x2" unglazed ceramic mosaics as follows:

American Olean #A52 "Buff Granite", unglazed ceramic mosaic tile.

Dal-Tile #D202 "Uptown Taupe Speckle"

Interceramic unglazed porcelain "Doti Light Grey" 2 x 2

Base shall be unglazed ceramic mosaic tile to match floor. Provide base height of 6" minimum. Provide bullnose top and end terminations, coved bottom recessed flush with flat tile and interior and exterior bullnose corner units.

Provide tile trim and accessories which match color and finish of adjoining flat tile.

Mounting: Where factory-mounted tile is required provide back- or edge-mounted tile assemblies as standard with manufacturer unless another mounting method is indicated.

Quarry Tile: Square-edged; 6" x 6" x 1/2": Base to be bullnose with coved bottom, at quarry tile floors, 6" high. Match existing surface texture as close as possible. Provide interior corners.

Color: Match existing as close as possible.

TILE PRODUCTS:

Synthetic Marble Thresholds and Window Stools: Shall be cultured marble of profiles indicated, 2" wide x 3/8" wide color white marbleized.

Window stools shall have 3/8" radius on all exposed corners, formed and ground.

SETTING MATERIALS:

Elastomeric Waterproof Membrane complying with ANSI A118.10. Acceptable products: Hydroment Ultra-Set Advanced; Laticrete 9235 and Mapei HPG.

Portland Cement Mortar Installation Materials: Provide materials to comply with ANSI A108.1 as required for installation method designated, unless otherwise indicated.

Ceramic Tile: Thin-Set Portland except Cement Mortar. where floor drains occur and where noted use portland cement mortar installation.

Dry-set portland cement mortar, ANSI A118.1, factory sanded; or latex-portland cement mortar, ANSI A118.4.

GROUTING MATERIALS:

Ceramic tile shall have acid resisting, dark color, grout joints, with final color selection by Owner. Graphite base material is not allowed.

Quarry tile grout shall match existing tile grout.

Tile Cleaner: Product specifically acceptable to manufacturer of tile and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation, 112 North Alfred St., Alexandria, VA 22134 or Ceramic Tile Institute, 700 N. Virgil Ave., Los Angeles, CA 90029.

PART 3 - EXECUTIONINSPECTION:

Examine surfaces to receive tile work and conditions under which tile will be installed. Do not proceed with tile work until surfaces and conditions comply with requirements indicated in reference tile installation standard.

INSTALLATION, GENERAL:

ANSI Tile Installation Standard: Comply with applicable parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile".

TCA Installation Guidelines: TCA "Handbook for Ceramic Tile Installation"; comply with TCA installation methods indicated or, if not otherwise indicated, as applicable to installation conditions shown.

Install a one part, troweled-on elastomeric seamless membrane waterproofing of at least 30 mils or 1/32" providing a positive moisture barrier at all toilet areas on elevated slabs.

Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.

Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars, or covers overlap tile.

Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise shown.

For tile mounted in sheets make joints between sheets same width as joints within tile sheet so that extent of each sheet is not apparent in finished work.

Grout tile to comply with referenced installation standards, using grout materials indicated.

Mix and install proprietary components to comply with grout manufacturer's directions.

Expansion Joints: Provide expansion joints in all tile where joints exist in concrete sub floors and as recommended by the manufacturer.

FLOOR INSTALLATION METHODS:

Thin Set Quarry tile or Ceramic Mosaic Tile: Install tile to comply with requirements indicated below for setting bed methods, TCA installation methods related to types of subfloor construction, and grout types:

Concrete Subfloor, Interior: TCA (bonded).

Setting Bed: Quarry Tile or Ceramic Tile (where Floor drains occur or where noted): Install tile to comply with requirements indicated below for setting bed method, TCA installation method related to type of subfloor construction, and grout type:

Portland Cement Mortar: ANSI A108.1.

Bond Coat: Portland cement paste on plastic bed.

Quarry and Ceramic Mosaic Tile: Slope tile floors to drains.

Thresholds: Install thresholds at locations indicated; set in same type of setting bed as abutting field tile unless otherwise indicated.

CLEANING AND PROTECTION:

Cleaning: Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter. Do not discolor tile with grout.

Grout Sealer: Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer that has gotten on tile faces by wiping with soft cloth.

Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but not sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

Remove temporary wax coating from paver tile, using methods recommended by manufacturer's of tile and grout.

Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.

Protection: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining damage and wear. Prohibit foot and wheel traffic from using tiled floors for at least 7 days after grouting is completed.

Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

End of Section 093000

SECTION 093100 - PORCELAIN TILEPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of tile work is indicated on drawings and schedules.

Types of porcelain tile work in this section include the following:

Unpolished Porcelain Floor tile
Metal edge strips and expansion joints installed as part of tile installations.
Thresholds.

QUALITY ASSURANCE:

Source of Materials: Provide materials obtained from one source for each type and color of tile, grout, and setting materials.

Contractor shall submit to the Owner a manufacturers certification that the tile delivered to the site is a true porcelain tile and meets the absorption rating of 0.5% maximum. The Owner may choose to randomly select six tile of each color from the tile delivered to the site. These tiles will be use to test the absorption rate prior to installation.

Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1.

SUBMITTALS:

Samples for Verification Purposes: Submit the following:

Samples for each type of tile and for each color and texture required, not less than 24" square, on plywood or hardboard backing and grouted.

Expansion Joint Material, min 12" piece.

Contractor shall submit a tile pattern layout plan of the entire school for review and approval prior to installation.

Contractor to submit manufacturer's certification that the tile delivered to the site is a true porcelain tile and meets the absorption rating of 0.5% maximum. The Owner may choose to randomly select six tile of each color from the tile delivered to the site. These tiles will be use to test the absorption rate prior to installation.

PRODUCT HANDLING:

Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.

Store tile in protected area or under cover on level ground; keep dry. Do not double-stack pallets.

PROJECT CONDITIONS:

Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.

Maintain temperatures at not less than 50 deg. F (10 deg. C) in tiled areas during installation and for 7 days after completion, unless higher temperatures required by referenced installation standard or manufacturer's instructions.

EXTRA MATERIALS:

Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

Tile Units: Furnish quantity of full-size units equal to **one percent** of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

PRODUCTS, GENERAL:

ANSI Standard for Ceramic Tile: Comply with ANSI A137.1 "American National Standard Specifications for Ceramic Tile" for types and grades for tile indicated.

ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 1999.

TCA (HB) - Handbook for Ceramic Tile Installation; Tile Council of America, Inc.; 2002.

ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.

ASTM C 150 - Standard Specification for Portland Cement.

ACCEPTABLE MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide products of one of the following manufacturers:

Type: Unglazed Porcelain Floor Tile: ANSI A137.1

Size and Shape: 12" square (actual full size)

Edges: Square

Interceramic

Series	Intertec Unpolished Porcelain
Color	Color Dot "Antrasit" (unpolished) Dotti Light Grey Matte (unpolished)

Daltile Corporation

Series	Harmonist
Color	Ambiance HM24 (unpolished) Composure HM23 (unpolished)

Crossville

Series	Cross - Colors Mingle
Color	Graphite (unpolished) Mica (unpolished)

SETTING MATERIALS:

Elastomeric Waterproof / Anti-Fracture Membrane: Provide self-bonding elastomeric membrane capable of heavy-duty service per ASTM C-627. Liquid applied products are not acceptable. Prime as required. Furnish in 12 inch and 36 inch wide sheets in continuous lengths required to cover cracks.

Acceptable products include:

"Laticrete 9235 Waterproof and Anti-Fracture Membrane" by Laticrete International, Inc.

"Strataflex Anti-Fracture Membrane" by National Applied Construction Products, Inc.

"Nobleseal CIS Crack Isolation Sheet" by The Noble Co.

LATEX-PORTLAND CEMENT MORTAR (THIN SET):

Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:

Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.

Prepackaged dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive.

Standard Unsanded Cement Grout: ANSI A118.6, color as indicated.

THRESHOLDS:

General:

Provide thresholds as indicated on drawings and details.

Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

Cherokee white Marble Thresholds: Shall be installed at all porcelain tile terminations unless noted otherwise.

Description: 2" W x 3/8" overall thickness, edges beveled 1/8" in 1/2 ".

GROUT:

Porcelain tile shall have acid resisting, dark color, grout joints, Basis of design is Custom Building Products, Grout color shall be Polyblend New Taupe #185. Graphite base material is not allowed.

Acceptable manufacturers include:

Mapei
Hydroment
Ardex
Laticrete
Custom Building Products

ACCESSORIES:

Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

Grout Sealer: Grout sealer shall not be required for epoxy grout joints.

Termination Edge Strips: aluminum, min. 1 1/2" wide, pre-finished, National Guard number 417. Strips shall be screw attached to sub floor with stainless steel screws.

ELASTOMERIC SEALANTS:

General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 7 Section "Joint Sealants."

Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

Chemical-Resistant Sealants: For chemical-resistant floors, provide chemical-resistant elastomeric sealant of type recommended and produced by chemical-resistant mortar and grout manufacturer for type of application indicated, with proven service record and compatibility with tile and other setting materials, and with chemical resistance equivalent to mortar/grout. Include primer and backer rod recommended by manufacturer.

MIXING MORTARS AND GROUT:

Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

Add materials, water, and additives in accurate proportions. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

EXAMINATION:

Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.

Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.

Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

Proceed with installation only after unsatisfactory conditions have been corrected.

PREPARATION:

Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.

Provide concrete substrates for tile floors that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.

Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.

Remove protrusions, bumps, and ridges by sanding or grinding.

In all concrete floor slab areas to receive tile, correct all cracks 1/16" or wider with crack bridging membrane prior to tile installation.

Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

Locate joints in tile surfaces directly above joints in concrete substrates. Where distance between concrete joints is greater than 25', maximum distance between tile expansion joints shall be 25'.

Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

INSTALLATION - GENERAL:

Install crack bridging membrane over all cracks in concrete greater than 1/16".

Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Handbook recommendations.

Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

Cut and fit tile to penetrations through tile including door stops, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

Sound tile after setting. Replace hollow sounding units.

Keep expansion joints free of adhesive or grout. Apply sealant to joints.

Allow tile to set for a minimum of 48 hours prior to grouting.

Grout tile to comply with requirements of the following tile installation standards:

For chemical-resistant epoxy grouts, comply with ANSI A108.6.

FLOOR TILE INSTALLATION:

General: Install tile to comply with requirements in the INSTALLATION SCHEDULE - FLOORS, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.

Tile floors composed of tiles 8 by 8 inches or larger.

Joint Widths: Install tile on floors with the following joint widths:

Paver Tile: $\frac{1}{4}$

Thresholds: Install thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.

INSTALLATION SCHEDULE - FLOORS:

Tile Installation: Interior floor installation on concrete; thin-set mortar; TCA F113 and ANSI A108.5.

Tile Type: Porcelain Tile (polished, unpolished).

Thin-Set Mortar: Latex-portland cement mortar.

Grout: Sand-portland cement.

CLEANING AND PROTECTION:

Cleaning: Upon completion of placement and grouting, clean all tile surfaces so they are free of foreign matter.

Remove temporary wax coating from paver tile, using methods recommended by manufacturer's of tile and grout.

Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.

Protection: Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining damage and wear.

Prohibit foot and wheel traffic from using tiled floors for at least 4 days after grouting is completed.

Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

End of Section 093100

SECTION 095100 - ACOUSTICAL CEILINGSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of each type of acoustical ceiling is shown and scheduled on drawings.

Types of acoustical ceilings specified in this section include the following:

Acoustical panel ceilings, exposed suspension.

QUALITY ASSURANCE:

Fire Resistance Ratings: As indicated by reference to design designation in UL "Fire Resistance Directory" for floor, roof or beam assemblies in which acoustical ceilings function as a fire protective membrane; tested per ASTM E 119. Provide protection materials for lighting fixtures and air ducts to comply with requirements indicated for rated assembly.

Coordination of Work: Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by or penetrating through, ceilings, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition system (if any).

SUBMITTALS:

Product Data: Manufacturer's product specifications and installation instructions for each acoustical ceiling material required, and for each suspension system, including certified laboratory test reports and other data as required to show compliance with these specifications. Provide shop drawings for absorption and diffusion panels, include elevations of mounting layout and details for mounting.

Samples: Set of 6" x 4" square samples for each acoustical unit required, showing full range of exposed color and texture to be expected in completed work.

DELIVERY, STORAGE, AND HANDLING:

Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

PROJECT CONDITIONS:

Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

EXTRA STOCK:

Deliver stock of maintenance material to Owner. Furnish maintenance material matching products installed, packaged with protective covering for storage and identified with appropriate labels.

Acoustical Ceiling Units: Furnish 2 % min. for each type ceiling tile.

Type I
Type Ia
Type II
Type III

PART 2 - PRODUCTS

ACOUSTICAL PANELS:

To be equal to Armstrong as follows (see finish schedule for types and areas): All tiles 0 - 25 Flame Spread ASTM E 84

Type I: 24" x 24" x 5/8", non-directional fissured design white finish.

Standard: Armstrong Cortega (770) Minaboard, Square Edge, typical.

METAL SUSPENSION SYSTEMS, GENERAL:

Standard for Metal Suspension Systems: Provide metal suspension systems of type, structural classification and finish indicated which comply with applicable ASTM C 635 requirements.

Ceiling grid tee sections shall be 1-1/2"x 15/16", and wall moldings shall be standard 1"x 1"angle, manufactured from quality cold-rolled steel, electro-zinc coated and prefinished with baked-on white coating.

Suspension system shall meet Zone 2 seismic requirements for building component parts.

Finishes and Colors: Provide manufacturer's standard finish for type of system indicated, unless otherwise required. For exposed suspension members and accessories with painted finish, provide color indicated.

Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung.

Hanger Wire: Galvanized carbon steel wire, ASTM A 641, soft temper, pre-stretched, Class 1 coating, sized so that stress a 3- times hanger design load (ASTM C 635, Table 1, Direct Hung), will be less than yield stress of wire, but provide not less than 12 gauge.

Edge Moldings and Trim: Metal of types and profiles indicated or, if not indicated, provide manufacturer's standard molding for edges and penetrations of ceiling which fits with type of edge detail and suspension system indicated.

Manufacturers of Steel Exposed Suspension Systems:

Same as acoustical unit manufacturer.

Chicago Metallic Corp.

Donn Corp.

National Rolling Mills, Inc.

Roper Eastern.

EXPOSED METAL DIRECT-HUNG SUSPENSION SYSTEMS:

Finish: White.

Structural Classification: Intermediate-Duty System.

Provide one hour fire rated where noted on the plans.

SOUND INSULATION:

Provide .5# (3-1/2") density unfaced sound batts (Sonobatt as manufactured by Owens Corning) above ceilings as noted on the drawings. Install at Offices, Staff Toilets, Midi lab and Dance studio.

Wall Mounted Impact Resistant Sound Absorption Panels:

Provide Manufacturer's standard panel construction consisting of an impact resistant, edge reinforced, glass fiber core with a fabric covering, constructed in accordance with ASTM E84 with flame spread: 25 or less, and smoke developed: 100 or less, and complying with the following:

Core Materials: 1/8" thick, high density (20 PCF) glass fiber board lightly bonded to a medium density (6 - 7 PCF), dimensionally stable, glass fiber board. Core shall be face sanded for smoothness and dimensional tolerances shall not exceed 0.020 inch.

Covering material: Woven 100% polyester fabric bonded or attached to the back of the panel frame. Guilford FR701, or approved equal.

Thickness: Not less than 2" panel thickness.

Acoustical Performance: NRC 0.95 per ASTM 423, Type A mounting.

Edge Detail: As selected by Architect from Manufacturer's standard.

Size: As shown on drawings.

Mounting: Provide complete Manufacturer's recommended mounting hardware with units.

Color/Pattern: Material, color, pattern and texture as selected by Architect from Manufacturer's standard.

Acceptable Manufacturers: Conwed, DeCoustics, Kinetics Noise Control, Wenger Corporation, Acoustical Resources, Inc. and Sound Concepts, Inc.

Wall Mounted Diffuser Panels:

Provide Manufacturer's standard panel construction consisting of thermo-molded plastic with thickness of not less than 0.125", reinforcement applied to the rear surface of panels of greater than 24 PCF, corner brackets for acceptance of mounting hardware, constructed in accordance with ASTM E84 with flame spread: 25 or less, smoke developed: 100 or less, and complying with the following:

Finish: Manufacturer's standard white, "suede" or "lemon-peel" texture.

Sizes: As indicated on the drawings.

Mounting: Provide complete Manufacturer's recommended mounting hardware with units.

Color/Pattern: Material, color, pattern and texture as selected by Architect from Manufacturer's standard.

Acceptable Manufacturers: Conwed, DeCoustics, Kinetics Noise Control, Wenger Corporation, Acoustical Resources, Inc. and Sound Concepts, Inc. .

Spray-on Sound Insulation Material: Pyroc Acoustement 30

Texture: Manufacturers standard, spray applied.

Color: Manufacturers standard color.

Thickness: 1"

PART 3 - EXECUTIONPREPARATION:

Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.

Coordinate grid framing layout with HVAC unit layout for ease of maintenance for the units. See Mechanical and Electrical drawings for lighting and mechanical unit layout.

INSTALLATION:

General: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, and industry standards applicable to work.

Install Seismic supports as detailed on the drawings.

Do not attach ceiling hangers to metal roof deck or joist bridging.

Do not attach grid members to edge moldings.

Install suspension systems to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers not less than 6" from each end and spaced 4'-0" along each carrying channel or direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8" in 12'-0". Provide additional ceiling hangers as necessary to insure there is a ceiling hanger at all four corners of all light fixtures.

Install hangers plumb (except at seismic supports) and free from contact with insulation or other objects within ceiling plenum which are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, countersplaying or other equally effective means.

Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units. Provide edge molding inserts with curved interior edge to conform to bullnose block wall conditions.

Screw-attach moldings to substrate at intervals not over 16" o.c. and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0". Miter corners accurately and connect securely. Provide edge molding inserts with curved interior edge to conform to bullnose block wall conditions.

Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

Marking: Marking of mechanical items above ceilings such as valves, dampers, duct heaters, controls, shall be accomplished with RED round double pronged brads at least 1" long. Mechanical Contractor to coordinate locations.

SPRAY-ON SOUND INSULATION:

Install on exposed roof deck and structure at new band area only.

Inspection/Preparation:

Contractor shall properly prep existing steel roof deck for space above music area. Contractor shall assure substrate is free of passivators, oil, grease, dirt, paint or other matter that would impair bond or install metal lath as recommended by manufacturer. Do not proceed until substrate and conditions are acceptable.

Prime substrate with primer or bonding agent as recommended by manufacturer.

Do not apply when temperature is below 44 degrees F (ambient) or substrate is below 40 degrees F.

Protect adjacent areas from over spray.

Provide ventilation where required, and avoid excessive drying rates.

Provide tarps or temporary enclosure where necessary to confine operations.

Patch and repair areas damaged by subsequent construction.

Application:

Apply in accordance with manufacturer's printed instructions (except no spray pass shall exceed ¼" thickness) using any spray equipment approved by the manufacturer.

Install thickness as specified.

Utilize acoustement plaster 40 for initial coats where recommended by manufacturer.

Cleaning and Patching:

Remove over spray and fallout immediately upon completion of the work in each area.

Repair or replace damaged work surfaces to acceptable conditions.

Coordinate work with other trades to minimize damage to insulation.

Patch damaged areas by over spraying or by patching procedures as required to provide acceptable results.

ADJUST AND CLEAN:

Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

End of Section 095100

SECTION 096500 - RESILIENT FLOORINGPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of resilient flooring and accessories is shown on drawings and in schedules.

QUALITY ASSURANCE:

Manufacturer: Provide each type of resilient flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives and sealants and leveling compounds.

Wherever possible, provide required resilient flooring and accessories produced by a single manufacturer.

SUBMITTALS:

Product Data: Submit 2 copies of manufacturer's technical data and installation instructions for each type of resilient flooring and accessory.

Samples: Submit, for verification purposes, samples of each type, color, and pattern of resilient flooring, including accessories, required, indicating full range of color and pattern variation.

Replacement Material: After completion of work, deliver to project site replacement materials from same manufactured lot as materials installed, and as follows:

Tile flooring: Not less than one (1) box

Base: Not less than fifty feet.

JOB CONDITIONS:

Maintain minimum temperature of 65 deg. F (18 deg. C) in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. Store resilient flooring materials in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 55 deg. F (13 deg. C) in areas where work is completed.

Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by manufacturer's recommended bond and moisture test.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

Vinyl Composition Tile:

Armstrong World Industries, Inc.
Azrock/Tarkett Floor Products Div., Azrock Industries, Inc.
Congoleum

Wall Base:

Allstate Rubber Company
Armstrong World Industries, Inc.
Azrock Floor Products Div., Azrock Industries, Inc.
Flexco Div., Textile Rubber Co.
Johnsonite
R.C. Musson
Roppe Corporation

MATERIALS:

Tile Flooring:

Vinyl Composition Tile: FS SS-T-312, Type IV; 12" x 12" unless otherwise indicated, and as follows:

Composition 1 - asbestos-free.

Gauge: 1/8"

Standard: Armstrong Standard Excelon Series.

Ramps: Armstrong Safety Zone slip resistant tile, color as selected by Architect. See drawings for extent of ramps.

At all spaces:Color:

Armstrong #51911 "Classic White".
Azrock/Tarkett #V-862 "Cloud White".
Congoleum CH-12 "Stone White".

Accessories:

Wall Base (WL BS): Provide base complying with FS SS-W-40; Type I rubber, with matching end stops and preformed or molded corner units, and as follows:

Thickness: 1/8" gauge.

Style: Standard top-set cove at all areas.

Finish: Matte Black.

Provide rubber base in 4'-0" lengths.

Rubber Tile: Minimum 1/8" thick Johnsonite "Roundel", Hammered (HRTS) solid color rubber tile.

Install on stair treads and intermediate landings.

Resilient Stair Risers:

Provide rubber risers on all stair risers, consisting of single-piece units for width of stair, or equal-length units if tread width exceeds available manufactured lengths.

Color as selected by Architect.

Acceptable Manufacturers:

Johnsonite, Musson, R.C.A. Rubber

Tactile Warning Strip:

Provide 1/8" thick rubber tactile warning strips at stair landings, as shown on drawings. Warning strip shall be CT-1820 by American Floor Products Company, Inc. (AFCO).

Stair Tread and Landing Edging shall be Gradus ELA 51750 with textured, contrasting color insert, as manufactured by Optimum Technologies, Inc., Cartersville, GA; Telephone: (770) 386-3470. Secure strips with mechanical fasteners and adhesive recommended by strip manufacturer.

Termination Edge Strips: aluminum, min. 1 ½" min. width, pre-finished, National Guard number 417. Strips shall be screw attached to sub floor with minimum 2" stainless steel screws at 12" o.c.

Adhesives (Cements): Waterproof, stabilized type as recommended by flooring manufacturer to suit material and substrate conditions.

Use epoxy adhesives recommended by manufacturer, at wet areas and entrances to toilets as noted on the drawings.

Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.

Leveling Compound: Cementitious type as recommended by flooring manufacturer.

PART 3 - EXECUTION

PREPARATION:

Broom clean or vacuum surfaces to be covered, and inspect subfloor. Start of flooring installation indicates acceptance of subfloor conditions and full responsibility for completed work.

Sand floors as necessary. Clean floor to remove all debris and imperfections.

Use leveling compound as recommended by flooring manufacturer for filling small cracks and depressions in subfloors.

Perform bond and moisture tests on concrete slabs to determine that concrete surfaces are sufficiently cured and ready to receive flooring.

Apply concrete slab primer, if recommended by flooring manufacturer, prior to application of adhesive. Apply in compliance with manufacturer's directions.

INSTALLATION:

General:

Install flooring using method indicated in strict compliance with manufacturer's recommendations. Extend flooring into toe spaces, door reveals, and into closets and similar openings.

Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent marking device.

Install flooring on covers for telephone and electrical ducts, and other such items as occur within finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers. Tightly cement edges to perimeter of floor around covers and to covers.

Tightly cement flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections. Hand roll flooring at perimeter of each covered area to assure adhesion.

Tile Floors:

Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room are of equal width. Adjust as necessary to avoid use of cut widths less than ½ tile at room perimeters. Lay tile square to room axis, unless otherwise shown.

Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged. Cut tile neatly around all fixtures. Broken, cracked, chipped, or deformed tiles are not acceptable.

Lay tile in "checkerboard" fashion with grain reversed in adjacent tiles.

Adhere tile flooring to substrates using full spread of adhesive applied in compliance with flooring manufacturer's directions.

Accessories:

NOTE: APPLY BASE TO ALL CABINETS.

Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Extend rubber base into accessible recesses under casework sink locations. Install base in lengths as long as practicable, with preformed corner units, or fabricated from base materials with mitered or coped inside corners. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.

On masonry surfaces, or other similar irregular surfaces, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

Place metal edge strips tightly to flooring and secure with 2" long stainless steel screws and set in. Install edging strips at edges of flooring which would otherwise be exposed.

CLEANING AND PROTECTION:

Remove any excess adhesive or other surface blemishes, using neutral type cleaners as recommended by flooring manufacturer. Protect installed flooring with heavy Kraft paper or other covering.

Finishing: After completion of project and just prior to final inspection of work, thoroughly clean floors and accessories.

Buff in compliance with flooring manufacturer's instructions.

End of Section 096500

SECTION 096800 - CARPETPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

The work to be done under this section shall include all labor, materials, services required including proper adhesives, seam cement, binding, edge strips, carpet attachment strips, etc., sufficient to produce a completed installation under the manufacturer's supervision, according to the manufacturer's detailed instructions acceptable to the Architect and Owner.

The carpet manufacturer shall carefully check all dimensions and other conditions in the field and shall be responsible for proper fitting of carpet in areas designated.

The carpet manufacturer shall be directly responsible to the General Contractor regarding schedule, payment, quantities and installation for all carpet.

The following information was incorporated into the specifications that were used by the Owner in the carpet bidding procedures:

“PART 1 - GENERAL1.01 AREAS OF APPLICATION

- A. *Floor carpet shall be provided within spaces as shown on the floor finish schedule shown on Drawing A2.4.*

1.02 QUALITY CRITERIA

- A. *Carpet supplier shall provide material that meets or exceeds all testing and performance criteria as set forth in the agreement with the Owner.*
- B. *Carpet supplier shall furnish three copies of these reports of test results to the general contractor on each project that was supplied with this carpeting material. The Owner, at his option, may order additional tests made on any portion of furnished fabric for conformance with the agreement. If material is noncompliant with specifications the carpet supplier will bear all testing costs.*

1.03 GUARANTEES

- A. *The manufacturer shall submit written guarantee that the carpet meets or exceeds all requirements for material as specified in Owner's agreement.*
- B. *The carpet contractor shall submit written guarantee that any defects in material or workmanship shall be corrected, at no cost to the Owner, for a period of two (2) years from date of substantial completion. Carpet contractor shall also provide written guarantee for five (5) years against not more than ten (10) percent surface wear on a non-prorated basis for both material and labor.*
- C. *Yarn manufacturer shall submit copies of the following written guarantees to the general contractor on each project:*
 - 1. *Ten (10) year color fastness guarantee*
 - 2. *Five (5) year guarantee against damage due to atmospheric contaminants*
 - 3. *Lifetime guarantee against static buildup (3.0 KV or less as tested under AATCC-134)*
 - 4. *Ten (10) year wear, ten (10) year edge ravel/zippering warranty*
 - 5. *20 lb. tuft bind warranty*

PART 2 - PRODUCTS

2.01 CARPET

- A. *Carpet shall be equal to or better than the following minimum specifications:*
 - 1. *Tufted level loop*
 - 2. *Face yarn - 100% solution dyed nylon*
 - 3. *Finished pile weight - 28 ounces per square yard*
 - 4. *Face weight - the ounces per square yard shall not be more than one-half ounce under the specified amount*
 - 5. *Dye method - solution dyed only*
 - 6. *Special treatments - fluorochemical*
 - 7. *Pile height - 0.156*
 - 8. *Gauge - 1/8*
 - 9. *Stitches per inch - 7.3*
 - 10. *Tufts per square inch - 58.4*
 - 11. *Primary backing - polypropylene*
 - 12. *Secondary backing - unitary - delamination strength = 2.5 pounds of force per inch, minimum average value*
 - 13. *Yarn ply - 5*
 - 14. *Denier - 1200/5*
 - 15. *Density - 6,000*
 - 16. *Weight density factor - 156,000*
 - 17. *Total weight - 63 ounces per square yard*

18. *Width shall not be less than 12'- 0"*
19. *Flammability Rating: (Critical Radiant Flux)*
 - a. *Flooring Radiant Panel Class 1 (ASTM E 648)*
 - b. *NBS Aminco Smoke Chamber Test - Specific Optical Density of 450 or less (ASTM E 662 Flaming Mode)*
 - c. *Surface Flammability - FF1-70 as found in 16 CFR 1630 and ASTM-D-2859 (Methenamine Pill Test)*
20. *Colorfastness to Light - Rating of not less than 4 after 40 AATCC fading units using AATCC gray scale for color change.*
21. *Colorfastness to Crocking - Rating of 4 minimum, wet and dry, using AATCC color transference scale.*
22. *Atmospheric Fading - Burned Gas shall not be less than 4 on International Grey Scale after two cycles on each test (AATCC Test Method 129 Ozone/AATCC Test Method 23).*
23. *Yarn must be twisted and heat set or air entangled. No single step or straight down yarn processing accepted.*
24. *Tuft bind shall resist 20.0 pounds of force (for loop pile only) min. average value.*

B. Color shall match custom color of "Rust" as originally manufactured for Gwinnett County Schools. Owner approval is required for all submittals. Carpet shall be subject to no minimums or overages.

C. Carpet Accessories

1. *At New Schools and Additions, furnish and install a one piece, beveled, Cherokee white marble threshold. Submit sample to the Owner for approval prior to installation.*
2. *At Renovation Projects where matching existing, carpet edge strips shall be aluminum with anodized finish as selected by Owner. Acceptable products include National Guard NGP416 or equal. All exposed edges and ends of carpet occurring at doorways, fixed frames and sidelights not covered by base, openings, and dissimilar floor finishes shall be terminated with aluminum moldings. Strips shall be 1-1/2" minimum width and shall be installed with minimum 2" long stainless steel screws.*
3. *Carpet adhesives shall contain low amounts of Volatile Organic Compounds (VOC) and shall be low odor.*

PART 3 - EXECUTION

3.01 CARPET INSTALLATION

- A. *All carpet shall be installed according to manufacturer's recommendations using approved adhesives and installation procedures/techniques.*

PART 2 - PRODUCTS

All products/materials related to the carpet and installation shall be as specified above and shall be included in the carpet manufacturer/supplier's price to the General Contractor.

Non-staining, reinforced building paper, which is used for protecting installed carpet during the duration of the construction phase, shall be provided and installed by the General Contractor.

The owner has obtained, through competitive bidding, the source and cost per square yard of carpet, carpet adhesive, carpet accessories and carpet installation for this project.

Style #:	R043Q-0
Style Name:	Associate 28oz. with Teklok Backing
Price:	\$13.42 per Sq Yd

The contractor shall purchase all carpet, carpet adhesive, carpet accessories and carpet installation from the designated manufacturer.

The contractor shall include in his Base Bid the total cost of all carpet, adhesive, accessories, installation, including overhead and profit.

The carpet manufacturer for this project is Shaw Contract Group. The contact at Shaw Contract Group is Jon McEntyre, (770) 878-0489, (jon.mcentyre@shawinc.com), 4651 Glory Maple Trace, Powder Springs, GA 30127.

PART 3 - EXECUTION

CARPET INSTALLATION:

Concrete floor slab to receive carpet shall be thoroughly dry, vacuumed, free of droppings, wax, grease oil, paint, varnish, hardeners, cement, moisture and any other material which would interfere with adhesion of carpet adhesive. Starting of work shall be construed as the carpet manufacturer's acceptance of the surface and the conditions of the work. The carpet manufacturer shall report in writing to the Owner any conditions which will prevent a satisfactory carpet installation.

Carpet shall be installed according to the carpet manufacturers recommendations, using approved adhesives and installation procedures and techniques.

Carpet manufacturer must supply Gwinnett County Schools with installers' qualifications, including reference installations of similar size and scope, and installation capacity sufficient to handle the scope of this work. All potential subcontracting partners must be identified at time of bid. Gwinnett County Schools reserves the right to refuse any installation contractor. Installers must have certification from International Certified Floorcovering Installers Association.

REMOVAL:

Any carpet removed in the existing building, all rubbish, wrapping paper, selvages etc, resulting from the carpet installation shall be removed from the job site by the General Contractor.

End of Section 096800

SECTION 099000 - PAINTINGPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of painting work is indicated on drawings, and as herein specified.

Work includes painting and finishing of interior and exterior exposed items and surfaces throughout project, except as otherwise indicated.

Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.

Work includes field painting of exposed bare and covered pipes and ducts (including color coding), and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under mechanical and electrical work, except as otherwise indicated.

"Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not be painted, paint exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these from standard colors or finishes available.

Following categories of work are not included as part of field-applied finish work.

Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) metal toilet enclosures, prefinished partition systems, acoustic materials, architectural woodwork and casework, elevator entrance doors and frames, elevator equipment, and finished mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.

Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.

Painting

Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.

Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting.

Following categories of work are included under other sections of these specifications.

Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, hollow metal work and similar items.

Unless otherwise specified, shop priming of fabricated components such as architectural woodwork, wood casework and shop-fabricated or factory-built mechanical and electrical equipment or accessories is included under other sections of these specifications.

Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

QUALITY ASSURANCE:

Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

A Pre-painting Conference will be held prior to application of any primers or painting.

SUBMITTALS:

Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.

Samples: Prior to beginning work, Architect will furnish color chips for surfaces to be painted. Use representative colors when preparing samples for review.

On actual wall surfaces and other exterior and interior building components, duplicate painted finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface, as directed, until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place work.

DELIVERY AND STORAGE:

Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

- Name or title of material.
- Fed. Spec. number, if applicable.
- Manufacturer's stock number and date of manufacturer.
- Manufacturer's name.
- Contents by volume, for major pigment and vehicle constituents.
- Thinning instructions.
- Application instructions.
- Color name and number.

Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.

Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

JOB CONDITIONS:

Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 deg. F (10 deg. C) and 90 deg. F (32 deg. C), unless otherwise permitted by paint manufacturer's printed instructions.

Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 deg. F (7 deg. C) and 95 deg. F (35 deg. C), unless otherwise permitted by paint manufacturer's printed instructions.

Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.

Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

PART 2 - PRODUCTSACCEPTABLE MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

Benjamin Moore
PPG Industries
Sherwin-Williams

Other manufacturers to be approved by Addendum shall submit a listing (name number, etc.) of paint materials for those specified for the various material headings for approval as well as paint material specifications.

Paint products by these manufacturers shall match the basis of design colors. Provide samples of each separate finish coat. Submit samples for review on all substrates receiving a finish coat. Samples shall be submitted and approved for color, sheen and texture for every project.

The various paints listed for the named manufacturers may not be the latest name and type of paint due to changing product lines of the manufacturer. Submit any deviations from those listed in writing for review and approval before use. Submittals shall be specific for the paint shown and not a general listing of a manufacturer's paints.

MATERIALS:

Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.

Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

Lead content in pigment, if any, is limited to contain not more than 0.06% lead, as lead metal based on the total non-volatile (dry-film) of paint by weight.

This limitation is extended to interior surfaces and those exterior surfaces, such as stairs, decks, porches, railings, windows, and doors which are readily accessible to children under seven years of age.

PART 3 - EXECUTIONINSPECTION:

Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator.

Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.

Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

SURFACE PREPARATION:

General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.

Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems in using the specified coating systems with substrates primed by others.

Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.

Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.

Cementitious Materials: Prepare cementitious surfaces of concrete, concrete block, cement plaster and fiber reinforced cement board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.

Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

Clean concrete floor surfaces scheduled to be painted with a commercial solution of muriatic acid, or other etching cleaner. Flush floor with clean water to neutralize acid, and allow to dry before painting.

Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, paneling.

When transparent finish is required, use spar varnish for backpriming.

SEAL TOPS, BOTTOMS, AND CUT-OUTS OF UNPRIMED WOOD DOORS WITH A HEAVY COAT OF VARNISH OR EQUIVALENT SEALER IMMEDIATELY UPON DELIVERY TO JOB.

Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these specifications. Clean and touch-up with same type shop primer.

Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

MATERIALS PREPARATION:

Mix and prepare painting materials in accordance with manufacturer's directions.

Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

APPLICATION:

General: Apply paint in accordance with manufacturer's directions.

DO NOT USE SPRAY EQUIPMENT FOR PAINTING EXCEPT AS NOTED. USE ONLY BRUSHES OR ROLLERS.

Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.

Provide finish coats which are compatible with prime paints used.

Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

Exposed structural steel shop labels and/or markings shall be removed and properly primed prior to field painting.

Painting

Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.

Where more than one finish coat of pigmented finishes is specified, the first coat shall be half-tone and the second coat shall be full color coat of scheduled color. Tinting shall be done by the paint supplier. The material shall not be modified in any manner on the job. All materials shall arrive on site in original, factory labeled containers.

Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.

Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.

Wood doors shall have a fruitwood stained finish with clear top coating. All wood doors shall be finished on all surfaces, including top and bottom edges.

Sand lightly between each succeeding enamel or varnish coat.

Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.

Metal surfaces shall not be painted by use of rollers, apply paint by brush only.

Galvanized building materials scheduled to be painted shall have all passivators removed, and shall be properly cleaned and prepared for priming and painting as recommended by the manufacturer.

For renovations and/or additions, all existing surfaces to be re-painted shall be evaluated by Contractor and paint manufacturer's Representative as to the type of existing paint used to ensure compatibility with new paint.

Provide a Certification by the manufacturer that the products supplied comply with EPA and local regulations controlling use of volatile organic compounds (VOCs).

Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.

Prime Coats: Apply prime coat of material which is required to be painted or finished, and which has not been prime coated by others.

Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

Pigmented (Opaque) Finishes: Where more than one finish coat is specified, the first finish coat shall be half-tone. The second finish coat shall be a full color coat of scheduled color. Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

Provide satin finish for final coats, unless otherwise indicated.

Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

FIELD QUALITY CONTROL:

The right is reserved by Owner to invoke the following material testing procedure at any time, and any number of times during period of field painting:

The Owner will engage and pay for services of an independent testing laboratory to sample paint being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in presence of Contractor.

Testing laboratory will perform appropriate tests for any or all of following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance and quantitative materials analysis.

If test results show that material being used does not comply with specified requirements, Contractor may be directed to stop painting work, and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are non-compatible.

CLEAN-UP AND PROTECTION:

Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.

Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

PAINT SCHEDULE:

General: Provide the following paint systems for the various substrates, as indicated.

The various paints listed for the named manufacturers may not be the latest name and type of paint due to changing product lines of the manufacturer. Submit any deviations from those listed in writing for review and approval before use. Submittals shall be specific for the paint shown and not a general listing of a manufacturer's paints.

It is the intent of this specification that Low VOC paints be used on this project. Additionally, Contractor shall provide a Certification by the manufacturer that the products supplied comply with EPA and local regulations controlling use of volatile organic compounds (VOCs).

CONTRACTOR NOTE: There are existing walls, to be repainted, which have deep base accent colors. Contractor shall visit site, observe conditions and provide adequate barrier coats to cover these accents, regardless of number of coats required. No accommodation for extra cost will be entertained by the Owner.

Colors:Interior wall paint:

Basis of design shall be Sherwin-Williams with the following colors approved:

- a. GCPS "White Cliffs"
ProMar 200 Latex Semi-gloss or product specified
Base: ProMar 200 Zero VOC Latex Semi-gloss, Extra White

One (1) gallon formula:
 B1-Black 3/32
 R2-Maroon 1/64
 Y3-Deep Gold 4/32 1/64

- b. GCPS "White Cliffs"
 Pro Industrial Pre-Catalyzed Epoxy Semi-Gloss or product specified
 Base: Pro Industrial Pre-Catalyzed Epoxy Semi-Gloss, Extra White

One (1) gallon formula:
 N1-Raw Umber 16/32
 Y3-Deep Gold 1/64
 B1-Black 1/64

- c. GCPS "White Cliffs"
 ProMar 200 Latex Eg-shel or product specified
 Base: ProMar 200 Zero VOC Latex Eg-Shel, Extra White

One (1) gallon formula:
 B1-Black 3/32
 R2-Maroon 1/64
 Y3-Deep Gold 4/32 1/64

Interior gypsum board ceiling paint:

Basis of design shall be Sherwin-Williams with the following colors approved:

SW1004 "Pure White"

Metal doors and frames:

Basis of design shall be Sherwin-Williams with the following colors approved:

Gwinnett Night Brown - Custom Formula:

Base: B54T104, Industrial Enamel Gloss Alkyd, Ultradeep base

One (1) gallon formula:
 B1-Black 6 oz. 22/32
 R2-Maroon 22/32
 W1-White 50/32 1/64
 Y3-Deep Gold 2 oz. 3/32 1/64 1/128

Painting

Other approved manufacturers include PPG and Benjamin Moore. Paint products by these manufacturers shall match the basis of design colors. Provide samples of each separate finish coat. Submit samples for review on all substrates receiving a finish coat. Samples shall be submitted and approved for color, sheen and texture for every project.

Classroom walls, administrative areas, work rooms, storage rooms:

- | | |
|-----------------------|---|
| One Coat - | Block filler (Apply filler coat at a rate to ensure complete coverage with pores filled.) Sherwin Williams PrepRite Interior/Exterior Block Filler, B25 W 25. |
| Two Coats (Minimum) - | Semi-Gloss Latex Enamel (4 mils WFT each coat). Sherwin Williams Pro-Mar 200 Latex Semi-Gloss Enamel, B31-2600 Series. |

Corridor walls, commons areas, science rooms: (Non Wet Areas)

- | | |
|-----------------------|--|
| One Coat - | Heavy duty block filler (apply filler coat at a rate to ensure complete coverage with pores filled.) Sherwin Williams Heavy Duty Filler, B42W00150. |
| Two Coats (Minimum) - | Single component pre-catalyzed waterborne acrylic epoxy (4 mils WFT each coat). Sherwin Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss, K46-150 Series. |

Toilet rooms, janitor closets, showers/locker areas: (Wet Areas)

- | | |
|-----------------------|--|
| One Coat - | Heavy duty block filler (apply filler coat at a rate to ensure complete coverage with pores filled.) Sherwin Williams Heavy Duty Filler, B42W00150. |
| Two Coats (Minimum) - | Single component pre-catalyzed waterborne acrylic epoxy (4 mils WFT each coat). Sherwin Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss, K46-150 Series. |

Gypsum Drywall / Walls and Ceiling Systems:

- | | |
|------------|---|
| One Coat - | Primer/Sealer (Apply to ensure complete coverage.) Sherwin Williams ProMar 200 Zero VOC Latex Primer, B28W02600, or approved equal. |
|------------|---|

Two Coats (Minimum) - Latex Eggshell Enamel (4 mils WFT each coat). Sherwin Williams ProMar 200 Zero VOC Latex Egg Shell, B20-2600, or approved equal.

Interior/Exterior Stucco Systems:

One Coat - Alkali-Resistant Acrylic Latex Primer (Apply to ensure complete coverage.) Sherwin Williams Loxon Acrylic Masonry Conditioner, A24-1100 Series, or approved equal.

Two Coats (Minimum) - Flat, Acrylic Latex Paint.
Exterior: Sherwin Williams Acrylic Flat House Paint, A-100 A6 Series, or approved equal.

Interior: Sherwin Williams ProMar 200 Latex Interior Flat, B30W2600, or approved equal.

Ferrous Metal: (Includes door/window framing and exposed building structures)

One Coat - Rust Inhibitive alkyd primer. Sherwin Williams KEM BOND HS Universal Metal Primer, B50Z Series, or approved equal.

Two Coats (Minimum) - Gloss alkyd industrial enamel (3.5 mils WFT each coat). Sherwin Williams Pro-Industrial Urethane Alkyd Enamel, B54 Series, or approved equal.

Painted Woodwork:

One Coat - Enamel undercoat. Sherwin Williams Premium Wall & Wood primer B28 W08111, or approved equal.

Two Coats (Minimum) - Alkyd semi-gloss enamel. Sherwin Williams ProMar 400 Alkyd Semi-Gloss Enamel B34-W4400 Series, or approved equal.

Transparent Finish - Woodwork (including doors):

1st Coat
 - Sherwin-Williams: Wood Classic Oil Stain (A49-200 Series), or approved equal.

2nd Coat
 - Sherwin-Williams: Wood Classic Fastdry Sanding Sealer (B26V43), or approved equal.

3rd Coat

- Sherwin-Williams: Wood Classic Polyurethane Varnish (A67 Series), or approved equal.

4th Coat

- Sherwin-Williams: Wood Classic Polyurethane Varnish (A67 Series), or approved equal.

- Fill open grained wood with filler and wipe before first varnish coat.

- Lightly sand between each sealer/varnish coat.

Concrete Floors:

Concrete conditioner/hardener/sealer See Section 33100. (No paint shall be used as a finish coat on concrete floors.)

MECHANICAL PAINTING:**NOTES:**

Aluminum or chrome is not to be painted.

Exposed electrical conduit in finished spaces to paint same as for surface seen against.

Insulated Piping (in finished spaces):

Two (2) coats paint compatible with vapor barrier or insulation. Do not paint aluminum vapor barrier.

Galvanized Metals:

Exterior: Includes exposed sheet metal duct work, bases, vents, fans, fan bases.

Interior: Exposed sheet metal duct work in finished spaces, uninsulated piping in finished spaces (except as specified for mechanical rooms).

Exterior: See Exterior Ferrous Metals

Interior: See Interior Ferrous Metals

Water Piping (non-insulated): Same as above.

Sprinkler Piping and Gas Piping - Exposed in Finished spaces: See Interior Ferrous Metals

Mechanical Rooms:

Paint all piping and equipment not prefinished (i.e. baked enamel) in mechanical rooms including pipe hangers, angles, support brackets, steel, iron, or concrete bases.

Color Code as Follows:

Pipe Hangers	Grey
Sprinkler Water Piping	Red
Gas Piping	Orange
Domestic Cold Water	Dark Blue
Bases, Pads, Supports	Grey
Breeching	Silver
Hot Water Piping	Green
Loop Supply	Light Blue
Loop Return	Light Green

The above shall be painted one coat semi-gloss enamel and one coat gloss enamel.

Galvanized Mechanical Equipment shall not be painted.

End of Section 099000

SECTION 100000 - BUILDING SPECIALTIESPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification sections apply to work of this section.

PROJECT CONDITIONS:

Shop Drawings: Shall be submitted for approval of all items specified under this Section before fabrication or installation.

Protection: All material and equipment shall be protected from damage or defacing until acceptance of the work by the Owner. Defective, damaged, or defaced material or equipment shall be repaired or replaced by the Contractor.

PART 2 - PRODUCTS AND INSTALLATIONFIRE EXTINGUISHER CABINET:

F.E. "C": J & L Industries AMBASSADOR Series 1017 white, powder coated steel, semi-recessed with 2 ½" rolled edge trim; door style F, full tempered glass, with standard pull handle and roller catch.

F.E. "B": Wall mounted bracket, top of extinguisher handle not to exceed 48" A.F.F., coordinate with Owner furnished fire extinguisher.

Extinguishers are provided by Owner for all cabinets and brackets.

Install top of cabinet (F.E.C.) at coursing 56" A.F.F., top of extinguisher handle shall not exceed 48" A.F.F.

Equal products of Standard Fire Hose Co., General Fire Extinguisher Co. Seco Mfg. Co., E.A. Dieterle Co., Larsens Co. will be acceptable.

VALVE CABINET:

Potter Roemer 8000 Series Model 8020 cold rolled steel with recoatable white polyester finish. Door and frame, recessed, door style "F," full tempered glass, with standard pull.

Equal products of J&L Industries and Larsens Co. Will be acceptable.

SIGNS (Match Existing):BUILDING INTERIOR SIGNAGE:

Submit Shop Drawing/Product Data of room list, numbers and proposed name signs.

All numbered rooms and spaces shall have an identifying sign.

Provide international picture/barrier-free symbol signs as required by code, in both size and color, for all handicapped facilities, toilet rooms.

Type "A" Signs: Not Used

Type "B" Signs:

All spaces receive Type "B" signs as stated in the specifications.

At all spaces, room number signs shall be 1/8" thick x approximately 2 1/2" high x length to allow for maximum of five 3/4" digits, one letter and two decimal points, with room number at the top and Braille letters underneath on the same sign. Letters shall be raised and Braille per ANSI and ADA. Raised lettering shall be 1/16" thick. Signs shall be 1/4" thick. Lettering, brailing and symbols shall be formed using a sand carved, photopolymer or thermoformed method. **No surface applied or chemically welded letters, Brailing or symbols are allowed.**

Lettering style shall be Helvetica condensed.

Number signs shall be provided at each end of each corridor, at each side of communicating doors, and at entry into all rooms or spaces.

Install all signs on wall at 60" above finished floor to centerline, 2" from latch edge of door frame or opening or as prescribed by code or ADA.

Provide name signs for restrooms and any other spaces required by codes. These signs shall be manufactured as Type B signs above, in length to accommodate the name, and mounted underneath the appropriate room number signage.

Type "C" Signs:

Provide engraved plastic name signs with non-glare surface, minimum 1/8" thick, with no Braille, at each electrical room that reads "ELECTRICAL" and at sprinkler riser rooms that reads "SPRINKLER RISER". Signs shall be red in color with 1 3/4" white Helvetica condensed letters. Install on face of door, centered, at 60" above finished floor to centerline.

Provide 5" x 5" international symbol signs for all handicap facilities. Secure with drilled inserts and vandal-proof screws.

Install handicap symbol sign at entrance to toilet rooms.

All signs at Toilet Rooms shall comply with all ADA requirements.

All signs shall be installed with silastic adhesive or double sided vinyl tape, and minimum of two vandal proof, stainless steel countersunk screws with finish to match sign. Install with drilled inserts at CMU.

Silicone rubber sealant shall not be used as adhesive for interior signage.**TRACKS AND CURTAINS:****Ceiling Channel Track (for Clinic Curtains):**

Track shall be extruded anodized aluminum having reinforced corners, smooth interior surfaces, approximately 1- $\frac{3}{8}$ " x $\frac{3}{4}$ " x .062" wall thickness and each cubicle track shall be in one continuous "L" shaped length.

Carrier assembly shall consist of two nylon wheels and axle, stainless steel bead chain and nickel plated hook.

End fittings (one snap-out type) shall be furnished for each track.

Approved; Assembly No. 19101 IFC-100 as manufactured by the Grant Pulley and Hardware Corporation Imperial Privacy Systems.

Curtains (for Clinic Curtains):

Material: Flame retardant material.

Design: Upper section of curtains shall be a 20" wide nylon panel (for light and ventilation when curtains are closed) sewn to the cloth.

Top hem shall be triple thick x 1- $\frac{1}{2}$ " wide with rustproof metal grommets installed at 6" centers. A cloth label shall be sewn on the hem denoting the curtain size.

Curtains shall be custom made with sufficient fullness to be 2'0" wider than the tracks on which they are run are long and shall extend from the ceiling track to within 12" of the finished floor.

Curtains shall be flameproof.

End of Section 100000

SECTION 101000 - VISUAL DISPLAY BOARDSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification sections apply to work of this section.

PROJECT CONDITIONS:

Shop Drawings: Shall be submitted for approval of all items specified under this Section before fabrication or installation.

Protection: All material and equipment shall be protected from damage or defacing until acceptance of the work by the Owner. Defective, damaged, or defaced material or equipment shall be repaired or replaced by the Contractor.

WARRANTY:

Writing surface of markerboards: Manufacturer's standard, written, warranty for the repair or replacement of the original boards should they not retain their original writing and erasing qualities, gloss variance, or color consistency under normal usage for a term not less than 50 years.

Workmanship and Materials: All boards shall be warranted against any and all defects in workmanship, materials or installation for a period of one (1) year from the dated of substantial completion.

PART 2 - PRODUCTSPRODUCT CRITERIA:

All boards shall be completely manufactured and fabricated by the same company.

All boards shall be one piece construction with no splices in surface materials.

MARKERBOARDS:

Core material shall be ½" medium density fiberboard backing of such texture on the reverse face that will allow the use of a standard chalkboard adhesive for attachment to a wall.

The writing surface of all boards shall be 28 gauge (minimum) porcelain enameled steel, writing surface seamless, high-gloss and "white" in color.

Perimeter trim shall be ¾" wide extruded aluminum. All trim and accessories shall be 6063-T5 alloy grade aluminum with type 201-R1 anodized satin finish.

All boards shall be furnished with the following accessories:

- 1" map rail with continuous cork insert, extending the full width of the board and end stops, color shall match tackboard surface.
- Chalk/marker tray, flat ribbed with ¾" radius comers and polished ends.
- One flag holder
- Two map winders
- Four 1" map hook clips

Provide 16 lineal feet of markerboard in each classroom and music rooms. Provide 8 lineal feet of markerboard in each workroom, planning room, conference room and small multi-purpose room. Boards shall be 4 feet in height. Verify complete room layouts with Owner.

TACKBOARDS:

The tackboard material shall be ¼" thick self-healing, vinyl impregnated colored cork with burlap backing positively adhered and banded to ¼" thick tempered hardboard. The hardboard backing shall be of such texture that will allow the use of standard chalkboard adhesive for attachment to a wall.

The cork material shall be fine grained and the color shall be throughout the cork material. The tack surface shall be washable with common household detergents. Color to be selected by Owner.

Perimeter trim shall be ¾" wide extruded aluminum. All trim and accessories shall be 6063-T5 alloy grade aluminum with type 201-R1 anodized satin finish.

All tackboards shall be furnished with 1" map rails with continuous cork insert and end stops, extending full width of tackboard. Insert color shall match tackboard surface.

Provide 16 lineal feet of tackboard in each classroom, including music rooms. Provide 8 lineal feet of tackboard in each workroom, planning room. Boards shall be 4 feet in height.

APPROVED MANUFACTURERS:

Acceptable products shall be as manufactured by the following:

1. Claridge Products and Equipment, Inc.
2. Newline Products, Inc.
3. PolyVision Corporation
4. Platinum Visual Systems
5. American Visual Display Products, LLC

PART 3 - EXECUTION

INSTALLATION:

Attach units to masonry walls using manufacturer's recommended mounting adhesive and clips. Adhesive shall be supplied with the boards for an application rate of one gallon per each 70 square feet of board.

No tackboards or tack strips shall be mounted any closer than 5'-0" to any classroom door.

MOUNTING HEIGHTS:

All boards shall be installed at the following heights:

33" to the bottom of the board, unless otherwise noted.

End of Section 101000

SECTION 101550 - TOILET COMPARTMENTSPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY:

This Section includes stock, manufactured toilet compartments.

Types of toilet compartments include:

Solid plastic, polymer resin.

Styles of toilet compartments include:

Overhead-braced.

Toilet accessories, such as toilet paper holders, grab bars, and purse shelves, are specified in another Division 10 Section.

SUBMITTALS:

General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

Product data for materials, fabrication, and installation including catalog cuts of anchors, hardware, fastenings, and accessories.

Shop drawings for fabrication and erection of toilet compartment assemblies not fully described by product drawings, templates, and instructions for installation of anchorage devices built into other work.

Samples of full range of colors for each type of unit required. Submit 6-inch-square samples of each color and finish on same substrate to be used in work, for color verification after selections have been made.

QUALITY ASSURANCE:

Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of work. However, allow for adjustments where taking of field measurements before fabrication might delay work.

Coordination: Furnish inserts and anchorages which must be built into other work for installation of toilet compartments and related items. Coordinate delivery with other work to avoid delay.

Toilet compartments shall match existing toilet compartment colors.

Solid polymer materials shall be tested in accordance and comply with ASTM E 84 Class B.

PART 2 - PRODUCTS

MANUFACTURERS:

Manufacturer: Products and colors by the following manufacturers are acceptable:

Scranton Products - Mosaic Series, "Sandcastle" or "Sandstone"
General Partitions/Rockville Partitions - #601 "Topaz"
PSISC - "Sand Speckle"
Metpar - "Stone Granite"
ASI Accurate Partitions - 9500 "Ivory Essence Speckle"

MATERIALS:

General: Provide materials which have been selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are not acceptable.

Solid-Plastic, Polymer Resin: High-density polyethylene (HDPE) with homogenous color throughout. Provide material not less than 1 inch (25 mm) thick with seamless construction and eased edges in color and pattern as follows:

Color and Pattern: Architect to select from manufacturer's full range of colors and patterns (standard, economy, and designer). All acceptable manufacturers shall produce a line of color/patterns similar to Santana Poly-Granite Hd.

Pilaster Shoes and Sleeves (Caps): ASTM A 666, Type 302 or 304 stainless steel, not less than 0.0312 inch (0.8 mm) thick and 3 inches (75 mm) high, finished to match hardware.

Stirrup Brackets: Manufacturer's standard ear or U-brackets for attaching panels and screens to pilasters of the following material:

Material: Stainless steel.

Full-Height (Continuous) Brackets: Manufacturer's standard design for attaching panels and screens to walls and pilasters of the following material: Stops and handles formed of flat sheet metal are not acceptable. Latches must be slide bolt type. Rotating knobs are not acceptable. Full height double flange continuous brackets shall be used on all stall fronts intersecting a wall, partition screen and on all urinal screens.

Material: Stainless steel.

Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories of the following material:

Material: Stainless steel.

Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile in manufacturer's standard finish.

Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip in manufacturer's standard finish.

Anchorage and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

Each compartment shall be complete with three stainless steel hinges, latch, coat hook, door bumper, and handicapped accessories where required.

All exposed fasteners shall have vandal-resistant, one-way heads.

FABRICATION:

General: Furnish standard doors, panels, screens, and pilasters fabricated for compartment system. Furnish units with cutouts, drilled holes, and internal reinforcement to receive partition-mounted hardware, accessories, and grab bars, as indicated.

Door Dimensions: Unless otherwise indicated, furnish 24-inch-wide in-swinging doors for ordinary toilet stalls and 32-inch-wide (clear opening) out-swinging doors for stalls equipped for use by handicapped.

Hardware: Furnish hardware for each compartment to comply with ANSI A117.1 for handicapped accessibility and as follows:

Hinges: Cutout inset type, adjustable to hold door open at any angle up to 90 degrees. Provide gravity type, spring-action cam type, or concealed torsion rod type to suit manufacturer's standards. Door hinges shall be field adjustable spring-loaded type to allow door to remain open 15 degrees from closed position when not latched.

Latch and Keeper: Manufacturer's standard surface-mounted latch unit, designed for handicapped accessibility, with combination rubber-faced door strike and keeper. Slide bolt operations only.

Coat Hook: Manufacturer's standard heavy duty cast stainless steel unit, combination hook and rubber-tipped bumper, sized to prevent door hitting mounted accessories. Flat metal, formed stops are not acceptable.

Door Pull: Manufacturer's standard heavy duty cast stainless steel unit for out-swinging doors. Provide pulls on both faces of handicapped compartment doors. Flat metal, formed handles are not acceptable.

Solid-Plastic, Polymer-Resin Compartments and Screens: Provide stainless steel heat-sink strips at exposed bottom edges of HDPE units to prevent burning.

PART 3 - EXECUTION

INSTALLATION:

General: Comply with manufacturer's recommended procedures and installation sequence. Install compartment units rigid, straight, plumb, and level. Provide clearances of not more than ½ inch between pilasters and panels, and not more than 1 inch between panels and walls. Secure panels to walls with not less than two stirrup brackets attached near top and bottom of panel. Locate wall brackets so that holes for wall anchorages occur in masonry or tile joints. Secure panels to pilasters with not less than two stirrup brackets located to align with stirrup brackets at wall. Secure panels in position with manufacturer's recommended anchoring devices.

Overhead-Braced Compartments: Secure pilasters to floor and level, plumb, and tighten installation with devices furnished. Secure overhead brace to each pilaster with not less than two fasteners. Hang doors and adjust so that tops of doors are parallel with overhead brace when doors are in closed position.

ADJUST AND CLEAN:

Hardware Adjustment: Adjust and lubricate hardware for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors (and entrance swing doors) to return to fully closed position.

Clean exposed surfaces of partition systems using materials and methods recommended by manufacturer, and provide protection as necessary to prevent damage during remainder of construction period.

End of Section 101550

SECTION 106050 - WIRE MESH PARTITIONSPART 1 - GENERALRELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes the following:

Standard-duty wire mesh partitions.

Related Sections: The following Sections contain requirements that relate to this Section:

Division 2 Section "Chain Link Fences and Gates" for chainlink fencing.

Division 8 Section "Door Hardware" for lock cylinders and keying.

Division 9 Section "Painting" for field painting wire mesh partitions.

DEFINITIONS

The types of weaves for the wire mesh specified in this Section are as illustrated and defined in ASTM E 437 and its Appendix X4.2:

Plain Weave: Wires pass over one and under the next adjacent wire in both directions.

SUBMITTALS

General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

Product Data for each type of product specified, consisting of manufacturer's specification, technical data, and installation instructions.

Shop Drawings showing fabrication and installation of wire mesh partitions, including plans, elevations, and large-scale details showing anchorage and accessory items. Provide location template drawings for items supported or anchored to permanent construction.

PROJECT CONDITIONS

Field Measurements: Check actual locations for wire mesh products by accurate field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication and delivery schedules with construction progress to avoid delaying the Work.

Where field measurements cannot be made without delaying the Work, guarantee location dimensions and proceed with fabricating wire mesh products without field measurements. Coordinate wall, column, floor, and ceiling construction to ensure that actual location dimensions correspond to guaranteed dimensions.

PART 2 - PRODUCTSMANUFACTURERS

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Acorn Wire and Iron Works, Inc.
G-S Company (The).
Hoosier Fence Co., Inc. (The).
Indiana Wire Products, Inc.
Kentucky Metal Products Co.
King Wire Partitions, Inc.
Lakeside Wire and Iron Co.
Miller Wire Works, Inc.
SpaceGuard Products.
Wire and Iron Products, Inc.
Central Wire & Iron Works

MATERIALS

Steel Wire: ASTM A 853.

Steel Channels, Angles, Plates, and Bars: ASTM A 36 (ASTM A 36M).

Steel Sheet: ASTM A 568 (ASTM A 568M).

Cold-Rolled Steel Channels: Formed from steel sheet.

Square Steel Tubing: Cold-formed structural steel tubing, ASTM A 500.

Galvanized Steel Wire: ASTM A 641 (ASTM A 641M).

Galvanized Steel Sheet: Commercial-quality, hot-dip-coated steel sheet, ASTM A 653, with G60 or A60 (ASTM A 653M, with Z180 or ZF180) coating.

STANDARD-DUTY MESH PARTITIONS

Mesh: 0.135-inch- (3.4-mm-) diameter, intercrimped steel wire woven into 1-1/2-inch (38-mm) diamond mesh, securely clinched to frame members.

Frames: Provide cutouts for pipes, ducts, beams, and other items shown or necessary for partition installation. Finish edges of cutouts to provide a neat, protective edge.

Vertical Members: 1-1/4-by-5/8-by-0.1046-inch (32-by-16-by-2.7-mm) cold-rolled steel C-Section channels with 1/4-inch- (6-mm-) diameter bolt holes approximately 18 inches (450 mm) o.c.

Horizontal Members: 1-by-1/2-by-1/8-inch (25-by-13-by-3-mm) cold-rolled steel channels, mortised and tenoned to vertical members.

Horizontal Reinforcing Members: 1-by-1/2-by-1/8-inch (25-by-13-by-3-mm) cold-rolled steel channels with wire woven through or two 1-by-1/2-inch (25-by-13-mm) steel channels bolted or riveted toe to toe through mesh, and secured to vertical members. Provide number of horizontal reinforcing members to suit panel height as recommended by partition manufacturer.

Vertical Stiffening Bars: For freestanding partitions 12 feet (3.66 m) in height or over, provide flat steel bar stiffener posts between abutting panel frames. Size as recommended by partition manufacturer for partition height required. Increase size of stiffening bars, if required, to maintain partition rigidity.

Top Capping Bars: 2-1/4-by-1-inch (56-by-25-mm) cold-rolled steel channels, secured to top framing channels with 1/4-inch- (6-mm-) diameter "U" bolts spaced not more than 28 inches (700 mm) o.c.

Corner Posts: 1-1/4-by-1-1/4-by-1/8-inch (32-by-32-by-3-mm) steel angles with floor shoe and 1/4-inch- (6-mm-) diameter bolt holes to align with bolt holes in vertical frame members.

Line Posts: Where partition runs exceed 20 feet (6 m) without intersecting or connecting to overhead framing, furnish 3-inch (75-mm) by 4.1-lb (1.9-kg) steel channel line posts with 5-by-18-by-1/4-inch (125-by-450-by-6-mm) steel base plates located at recommended intervals to ensure partition rigidity and stability.

Intersection Posts: Where 3- or 4-way intersections occur, use 1-1/4-by-1-1/4-inch (32-by-32-mm) tubular steel posts with floor shoe and 1/4-inch- (6-mm-) diameter bolt holes aligned for bolting to adjacent panels.

For other than 90-degree intersections, use manufacturer's recommended tubular steel corner posts and installation accessories.

Floor Shoes: Cast metal, sized to suit vertical framing and to provide approximately 3 inches (75 mm) of clear space between finished floor and bottom horizontal frame members. Furnish units with set screws for leveling adjustment.

Sheet Metal Base: Panels of 0.0598-inch- (1.5-mm-) thick steel sheets, welded or bolted to frames.

DOORS

Hinged Door: Door frame of 1-1/4-by-1/2-by-1/8-inch (32-by-13-by-3-mm) steel channels with 1-1/4-by-1/8-inch (32-by-3-mm) flat steel bar cover plates on 3 sides, and 1/8-inch- (3-mm-) thick angle strike bar and cover on lock side. Provide 1-1/2 pairs of 3-by-3-inch (75-by-75-mm) butt hinges riveted or welded to door and frame, and mortise-type cylinder lock operated by key outside with recessed knob inside. Align bottom of door with bottom of adjacent panels.

Provide manufacturer's standard mortise lock to receive cylinders provided under another section..

Cylinders for locks are specified in Division 8 Section 087100, "Finish Hardware."

FABRICATION

Do not use components less than sizes indicated. Use larger-size components as recommended by partition component manufacturer.

Provide bolts, hardware, and accessories for complete installation.

Finish: Manufacturer's standard, shop-applied enamel finish. Provide manufacturer's standard finish color.

PART 3 - EXECUTION

PREPARATION

Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

Provide partition sections to close any opening between beams where partition is interrupted by perpendicular beams. All edges shall be framed and secured.

INSTALLATION

Erect partitions plumb, rigid, properly aligned, and securely fastened in place, complying with Drawings and manufacturer's recommendations.

Provide additional field bracing as shown or necessary for rigid, secure installation. Installer to provide additional clips and bracing as required.

ADJUSTING AND CLEANING

Adjust moving components for smooth operation without binding.

Touch up damaged finish after completing installation using field-applied paint to match color of shop-applied finish.

End of Section 106050

SECTION 108000 - TOILET ACCESSORIESPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of each type of toilet accessory is indicated on drawings and schedules.

QUALITY ASSURANCE:

Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.

Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.

SUBMITTALS:

Product Data: Submit manufacturer's technical data and installation instructions for each toilet accessory.

PART 2 - PRODUCTSACCEPTABLE MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide toilet accessories by one of the following:

Accessory Specialties, Inc.
Bobrick Washroom Equip., Inc.
Bradley Corp.
Franklin Brass Manufacturing Co.
McKinney/Parker
World Dryer

PRODUCTS:

The following items are Bobrick units, except as noted:

Soap Dispenser: N.I.C.

Paper Towel Dispenser: N.I.C.

Toilet Paper Holder: N.I.C.

Sanitary Napkin Disposer: N.I.C.

Mirror without shelf Bobrick B-165 - 18 x 48 (top mounted at 74" A.F.F.)

Grab Bars Bobrick B-6193 x 48"(single), B-6106 x 36" (single)

Mop Rack (mop strip) Bobrick B-223 x 24

Hand DryerWorld Dryer Airmax Model XM5-0974A, 115V, 20 amps, 60 Hz, universal type motor, 1/6 hp at 12000 rpm, white cast iron housing with fixed nozzle. Provide with infrared sensor for hand detection to automatically initiate and terminate drying. Delivered air volume-238 cfm at 98 mph. Mount 42" from finish floor to bottom of dryer.

"Hand dryers by or for World Dryer, only, are acceptable."

General Contractor Note: When hand dryers are delivered to the site, Electrical Contractor shall disconnect the heating element in each unit prior to installing.

PART 3 - EXECUTIONINSTALLATION:

Install toilet accessory units in accordance with manufacturer's instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated.

Install toilet accessories at locations shown on the drawings.

ADJUSTING AND CLEANING:

Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

Clean and polish all exposed surfaces after removing labels and protective coatings.

End of Section 108000

SECTION 114800 - SCIENCE LABORATORY EQUIPMENTPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION:

This section of the specifications describes requirements pertaining to laboratory equipment for all cabinets in Science Laboratories, and Science preparation areas. All science laboratory equipment to be supplied from a single source.

SUBMITTALS:

Submit five (5) sets of shop drawings, specification and date and descriptive literature to Architect for review and approval.

MANUFACTURERS:

Laboratory equipment shall be as specified and as manufactured by one of the following:

1. Collegedale Casework, Inc.
2. Kewaunee Scientific Equipment Corporation
3. Taylor Manufacturing Company
4. Laboratory Furniture
5. Leonard Peterson Company
6. Hamilton Industries, Inc.;
7. Southside Manufacturing, Inc.
8. Sheldon Laboratory Systems

The catalog numbers listed on the drawings are from Kewanunee Scientific Equipment Corporation for casework identification used on drawings. The use of these catalog numbers on the drawings in conjunction with this section of the specifications is to facilitate the location of items and to establish quality requirements, and such use is not intended to inhibit competition in any manner.

To be considered for approval other manufacturers shall supply the following:

Samples as listed below made in accordance with this Specification. These shall be delivered, at no cost to the Director of Construction, Gwinnett County Public Schools, 53 Gwinnett Drive, Building C, Lawrenceville, Georgia 30046. Samples shall be full size, production type samples. Miniature, or "SHOW ROOM" type samples are not acceptable. Samples will be retained until completion of contract to insure that material delivered is in accordance with approved samples.

Full size base cabinet containing both drawer and cupboard.

Table corner sample, showing frame construction, section of table leg with cuff.

Samples of representative utility service outlet fixtures, lock, hinge and pull.

Samples of all top materials.

SHOP DRAWINGS:

Shop drawings shall show layout and dimensions for reference by mechanical trades, product reference numbers, construction details where necessary and relationship of this work to other work.

FIELD MEASUREMENTS:

Field measurements must be taken to verify that the equipment will fit into the designated space. Entry ways, corridors and door openings shall be verified to ensure that the equipment be manufactured in a manner to permit it to be moved through properly into place.

WARRANTY:

Casework Contractor shall guarantee to replace or repair at no expense to the owner, all materials of this contract found to be defective within one (1) year of acceptance, due to defective materials and/or workmanship.

SCOPE:

Furnish and install the following under this Section of the Specifications:

All cabinet and casework including tops and ledges and supporting structures, and miscellaneous items of equipment as listed in these specifications and shown on drawing details, delivery to the building, unpacking, setting in place, leveling and scribing to walls and floors. Furnish and install all filler panels, knee space panels where specified, and scribes as shown.

All utility service outlet accessory fitting, vacuum breakers, electrical receptacles and switches as listed in these specifications and shown on the drawings, equipment schedules or as shown on drawings as mounted on the laboratory furniture. These items when required, are to be supplied with tank nipples and lock nuts.

All laboratory sinks, cup sinks or drains, drain troughs, overflows and sink outlets with integral or separate tail pieces, where specified, which occur above the floor and these are part of the equipment as listed in the specifications, equipment schedule, or shown on drawings. Integral tail pieces shall be in accordance with the manufacturer's standards; separate tail pieces shall not exceed 6" in length. All tail pieces shall be furnished with couplings required to connect to the drain piping system.

Furnish and install service strip supports, where specified and set in place, service tunnels, service turrets, supporting structures and reagent racks of type shown on details or specified. Furnish service lines in reagent racks only when such service lines are specifically specified as part of this section of specifications.

WORK NOT INCLUDED IN SCIENCE LABORATORY EQUIPMENT:

Equipment, materials and labor furnished by others are as follows:

Furnishing and installing of all framing, bucks, metal grounds, or reinforcements for walls, floors and ceilings to adequately support the laboratory equipment, brick and plaster grounds for proper anchoring of the equipment.

Connecting all utility service outlet fittings furnished by laboratory equipment contractor.

Furnishing fluorescent tubes, light bulbs and any other miscellaneous materials generally classified as maintenance or supply items.

Installer shall be responsible for protection and security after laboratory equipment installation has been completed.

It is the intent of the specifications that the General Contractor be responsible for overall installation until turned over to the Owner. In this case "Installer" means the General Contractor.

"Others" is defined as separate and independent contractors who have no connection whatsoever with the "Laboratory Furniture Manufacturer" mentioned in these Specifications. Plumbers, Electricians, Heating and Ventilating Contractors and other subcontractors or mechanics required to complete "Work by Others" sections are not to be reimbursed by the Laboratory Furniture Manufacturer under these specifications.

PART 2 - PRODUCTS

MATERIALS:

Solid woods shall be properly air dried, then kiln dried to 5% to 6% moisture content, and then tempered in inside storage to a moisture content of 6% to 8%. Woods showing on exposed surfaces shall be Northern hard Maple, carefully selected for color and grain. Woods used in interior construction may be maple, birch or other suitable hardwoods, clear and sound.

Lumber core shall be balanced construction consisting of solid hardwood stave core, hardwood cross plies, and face veneers of 1/28" selected Maple. Lumber Core for doors shall additionally include an internal end band. Lumber Core shall conform to ANSI/HPMA HP 1983 product standards.

Plywoods shall be balanced veneer core construction glued with water resistant resin adhesives. Hardwood plywoods for exposed surfaces shall have face veneers of 1/28" selected Maple and shall conform to ANSI/HPMA HP 1983 product standards. Plywood for interior and unexposed surfaces may be hard plywoods conforming to U. S. Department of Commerce Voluntary Product Standard PS-1. (Interiors of open cases and cases with glass or glazed doors are considered exposed surfaces.)

Tempered Welded Fiber shall be exploded wood fibers and natural lignin binding agent compressed into dense homogeneous sheets. Sheets are impregnated with a special tempering compound polymerized by baking to give exceptional strength.

Glass for framed glazed doors shall be double strength. Glass for frameless sliding doors shall be 1/4" polished plate. Glass for fume hood sashes shall be 1/4" laminated safety glass.

CONSTRUCTION:

Base Units shall be designed with solid ends and backs, semi-overlap radius lipped doors and drawers, astragal strip between double swinging doors, and fully enclosed to space protect all interiors against dust and vermin. End panels shall be 3/4" plywood with front exposed edges of panels faced with solid hardwood. End panels shall be glued to horizontal frame units and to solid bottom panels.

Joint construction shall be blind, not extended to face of cases. Jointery utilizing blind mortise and tenon, multiple dowel, or stopped tongue and groove shall be acceptable. Backs shall be 3/16" tempered welded fiber, grooved into end panels. Where access to services is required, cupboard backs shall be removable. Cupboard bottoms shall be 3/4" plywood with exposed edge faced with solid hardwood providing a flush interior for ease of cleaning. Lock security panels shall be 3/16" tempered welded fiber fitting into an integral groove within the intermediate frame units. Shelves shall be half-width, adjustable with 1/4" round holes and formed brass inserts at 1" o.c., and made of 3/4" plywood with exposed edge faced with solid hardwood. Shelves over 35" in length to be supported from back panel of cabinet. All toe spaces shall be 2-1/2" deep and 4-1/4" high, fully enclosed and an integral part of the case.

Horizontal frame member sizes are as follows:

Top Horizontal:	Front & Rear	2-1/2" x 1-1/4" hardwood
	Side	1-1/4" x 1-1/4" hardwood
	Center	1-1/4" x 1-1/4" hardwood
Intermed. Horiz.:	Front & Rear	2-1/2" x 3/4" hardwood
	Side	1-1/4" x 3/4" hardwood
	Center	3-1/4" x 3/4" hardwood

Bottom: Bottom to be $\frac{3}{4}$ " plywood with exposed edge faced with solid hardwood providing a flush interior.

Wall Cases shall be integrally constructed to provide a fully enclosed unit designed to ensure a dust and vermin-free interior. End panels shall be $\frac{3}{4}$ " plywood with exposed edges faced with solid hardwood. Tops and bottoms shall be 1" plywood with exposed front edges faced with hardwood. End panels shall be glued to top and bottom panels through blind mortise and tenon or doweled joints. Further reinforcement through screws, cleats, hot glue and stapled pins shall be provided. Backs shall be $\frac{1}{4}$ " hardwood plywood grooved into end and bottom panels and further secured through the use of glue and unexposed top and bottom back rails. The interior of the cases shall be completely flush for ease of cleaning. Shelves shall be 1" plywood with front edge faced with solid hardwood, fully adjustable.

Tall Cases shall be integrally constructed to provide a fully enclosed unit designed to ensure a dust and vermin-free interior. End and bottom panels shall be $\frac{3}{4}$ " plywood with exposed edges faced with solid hardwood. Top panel shall be 1" plywood with exposed front edge faced with solid hardwood. End panels shall be glued to top and bottom unit through blind mortise and tenon or doweled joints. Further reinforcement through screws and cleats (not glue and stapled pins) shall be provided. Fixed shelves shall be firmly mounted on supporting cleat or appropriate internal joinery. Backs shall be $\frac{1}{4}$ " hardwood plywood where exposed, $\frac{1}{4}$ " tempered welded fiber behind solid doors, grooved into end panels and further secured with glue, staples and unexposed top and bottom back rails. The interior of the case shall be completely flush for ease of cleaning. All shelves shall be minimum $\frac{3}{4}$ " plywood. Shelves shall have the front edge faced with solid hardwood. Adjustable shelves shall be fully adjustable with shelves over 35" in length to have additional support at center of shelf. All toe spaces shall be 2- $\frac{1}{2}$ " deep and 4- $\frac{1}{2}$ " high, matching base units, fully enclosed and an integral part of the case.

Panel Doors shall be solid core construction consisting of a hardwood banded core, 1/16" poplar cross-ply select Northern hardwood Maple veneer faces. Doors shall be $\frac{3}{4}$ " thick except hinged doors over 48" in height which shall be 1-1/16" thick. All doors shall be radiused lip on edges of swinging doors, square on sliding doors. Double swinging doors shall meet with an astragal being formed by way of the right-hand door overlapping an inset lip on the left-hand door. Hinged doors shall have two hinges per door for doors to 48" high and three hinges per door 48" high. Sliding doors shall be hung on adjustable hangers and ride on nylon rollers on an extruded aluminum track attached to the upper front rail or panel of the case.

Glazed Doors shall have framing members of solid hardwood 1-1/16" x 3". Horizontal and vertical members shall be joined through mortise and tenon joints, glued and pinned. Glass shall set into doors from rear and shall be held in place by resilient plastic molding. Door operation, hinged or sliding, shall be identical to doors above.

Drawers shall have fronts $\frac{3}{4}$ " thick of solid five-ply hardwood lumber core construction laminated with select Northern Hardwood Maple veneer faces with radius lip to match doors. Drawer sides and back shall be $\frac{7}{16}$ " laminated hardwood with sides dovetailed to front of drawer and back dadoed into sides. All joints shall be glued and the back further secured with stapled pins. Bottoms of drawers shall be $\frac{3}{16}$ " tempered welded fiber, grooved into front, sides, and back of drawer. Drawer bottoms shall be further secured with hot glue flowed into the bottom retention grooved from the underside thus forming a rigid and unitized drawer box. Drawer guide system shall be a three point suspension system. A self-lubricating nylon back plate shall be integrally assembled at the back of the drawer and shall slide over a "T" shaped wood guide secured to the cabinet rails with screws. Two nylon angle clips shall be secured to the rails at a sliding surface for the drawer slides. Drawer guide system shall provide smooth operation under all load conditions.

Table legs shall be $2\text{-}\frac{1}{4}$ " square with all corners radiused $\frac{3}{16}$ ". Legs shall be secured to apron frame by a $\frac{3}{8}$ " heavy duty hanger bolt through a heavy gauge metal corner brace. Brace shall be dadoed into apron rails and securely fastened with screws. All apron rails shall be 1" lumber core with bottom edge radiused $\frac{1}{4}$ ". Compartment bottoms shall be $\frac{1}{4}$ " hardboard glued and pinned in place. Leg stretchers shall be provided where required, $1\text{-}\frac{1}{4}$ " x $2\text{-}\frac{1}{2}$ ", secured to legs with a draw bolt at each end. A $2\text{-}\frac{1}{2}$ " high die-formed boot shall be fitted to each fixed leg at the floor concealing the anchoring device. Movable tables shall have legs fitted with $1\text{-}\frac{1}{2}$ " diameter adjustable non-marring floor guides.

HARDWARE:

Pulls for drawers and doors shall be of a clean, modern design offering a comfortable hand grip, and shall attach to drawer or door with machine screws on 4" centers. Pulls shall be of extruded aluminum with satin lacquer finish.

Flush Pulls for bypass sliding doors shall be satin chrome finish, recessed to provide finger grip.

Latching Assembly for tall case double swinging doors shall consist of an eccentric plate operating two $\frac{1}{8}$ " x $\frac{5}{8}$ " plated locking bars, one extending upward and the other down. Each bar shall operate through an extruded nylon guide and, when locked, shall engage a strike plate providing positive latching for the left-hand door. The lock attached to the right-hand door shall operate a bolt which, when locked, shall overlap the left-hand door providing secure locking. Single doors shall be locked to case sides.

Hinges shall be five-knuckle institutional type heavy-duty hinges with off-set wrap-around wings. Hinges shall be $2\text{-}\frac{1}{2}$ " steel, with satin chrome finish. Hinges are to be mounted to door and case with not less than three screws per wing.

Catches shall be provided on swinging doors and shall be a spring-loaded nylon roller type.

Elbow Catches shall be used on left-hand doors where required for latching security when doors are to be locked. Elbow catches shall be steel, zinc plated.

Locks shall be provided on all doors, drawers and overhead cabinets. All locks, for the purpose of coordinating keying systems, shall be Illinois office two sets of four tumblers locking in opposite splines. Positive tumbler operation shall be accomplished by cam action without the aid of springs. The lock system shall guarantee security which restricts the duplicating of keys to registered locksmiths. Exposed surface of locks shall match other cabinet trim. Provide three (3) keys for each lock and three (3) master keys for each project.

Drawer Stops shall be provided on all drawers to prevent inadvertent removal. Stops shall be automatic type, zinc plated steel.

Shelf Supports shall be die-formed brass inserted into predrilled holes on interior of cabinets. Supports shall provide shelf adjustment on 1" centers. Shelves longer than 35" shall have additional support at center.

Base Molding shall be pliable, black, 4" high, coved to the floor at the bottom and shall be cemented tightly against exposed areas at the floor with waterproof adhesive.

Stainless Steel Corners shall be furnished on all exposed base corners and shall be designed to conform to the contour of the base moulding and be attached with four stainless steel nails. Finish shall be brushed.

Leg Shoes shall be die-formed, black in color, and furnished to all fixed open table legs, 2-1/2" high and coved to floor.

Permaresin Sinks and Drain Troughs shall be made of modified epoxy resins and shall be completely cured during processing. Sinks shall be black, non-glare finish, with all corners coved, and with bottom dished at least 1 degree toward outlet to insure complete drainage. Sinks shall have a high resistance to mechanical and thermal shock.

Sink Sizes

Prep Room Counter

18" x 15" x 7"

MECHANICAL SERVICE FIXTURES AND ACCESSORIES:

Laboratory Fixtures shall be of red metal, laboratory grade, with a copper content of at least 85% (except forged units), and shall have a heavy duty polished chrome finish. Serrated hose connectors shall be provided on all fixtures, either removable or an integral part, unless otherwise specified. Vacuum breakers shall be of chrome plated brass with serrated nozzle.

Water Fixtures shall be of the washerless replaceable cartridge type and shall be convertible to or from self-closing without disturbing the faucet installation. Cross handles shall operate one quarter turn full flow to off. Gooseneck spouts shall be combination rigid or swing. Fixture outlets shall be tapped 3/8" straight thread IPS to accommodate removable hose connections, filter pumps, aerators, etc.

Provide double gas cocks at all work stations for which plumbing drawings show gas piping.

SINKS AND DRAIN TROUGHS:

Nipple Shank connections shall be provided complete with locking nut and washer for all fixtures where fittings are anchored to equipment.

Index Buttons mounted in fixture handles shall identify the following services. Buttons shall be color-coded and lettered.

Hot Water	HW	Red
Cold Water	CW	Green
Gas	Gas	Blue
Air	AIR	Orange
Vacuum	VAC	Yellow
Distilled Water	DW	White

Electrical Fixtures shall contain 20 amp., 125 V., ground fault interrupting (GFI) 3-wire polarized grounded receptacles. Pedestal and line-type boxes shall be of aluminum with stainless steel cover plates. Flush mounted receptacle boxes shall be of plated steel.

Support Rods, Socket Plates, Crossbars: Support rods shall be 3/4" in diameter, 36" long, anodized aluminum, rounded on top end and tapered on bottom to fit socket in socket plate. Socket plate shall be accurately machined aluminum with locker washer and locknut. Horizontal bars shall be 3/4" anodized aluminum rounded both ends. Bar clamps shall be anodized machined aluminum with thumb screws.

Sink Outlets for resin sinks shall be 1-1/2", chemical resistant synthetic with removable disk strainer, locknut, and machining for overflow. Assembly shall be threaded for connection to waste system. Overflow will not be furnished for sink outlet except as specifically called for in equipment schedules or on drawings.

COUNTERTOPS:

Tops shall be epoxy resin. Lipped epoxy resin sinks are acceptable. Where lipped sinks are used, tops shall be relieved to make top of lip flush with countertop surface.

CASEWORK FINISH:

All exteriors and exposed surfaces to receive finish shall be free of machine marks, carefully and smoothly sanded in preparation for finishing. Exteriors, inside surfaces of doors, cupboard interiors and shelves shall then be stained, followed by resinous sealer, dried properly and carefully sanded. Two coats of chemical resistant catalyzed synthetic alkyd-urea resin varnish shall then be applied and thoroughly dried, resulting in a smooth semi-gloss finish. Drawer boxes shall receive the same finish except that the stain may be omitted. Bottoms, unexposed backs and ends shall be sealed with pigmented resinous sealer. Top frames, interior of drawer openings and toe eases shall be sealed with clear sealer.

FUME HOOD:

Fume Hoods shall be Airfoil Fume Hood Model No. 8A-2004E as manufactured by Collegedale Casework, Inc., Collegedale, TN 37315.

Hood shall have interiors constructed of fire and chemical resistant, epoxy coated (non-asbestos) composition board. Hood shall incorporate automatic air bypass features.

Work Counter shall be Permaresin, dished to retain spillage. Provide oval cup drain.

Provide cold water, gas, air and vacuum fittings with control handles located on front of cabinet posts.

Provide two built-in 115V AC electrical outlets. Provide explosion-proof lighting with exterior switch.

Base cabinet shall be provided by Fume Hood Supplier. Provide cupboard vent.

Acceptable Manufacturers: Airfoil Fume Hood; Hemco Corporation; Fisher Hamilton, Jamestown Metal Products, Sheldon Laboratory Systems.

PART 3 - EXECUTIONINSTALLATION:

The casework specified herein shall be delivered to the building in prefinished modular units. It shall be set in place, leveled, secured to walls or floors as necessary, trimmed or scribed to make a neat installation. Installation shall be under the direction of a factory approved superintendent.

The casework contractor shall install all sinks, troughs, service fixtures, etc., as supplied in this section, for connection by the appropriate trades. See paragraphs under SCOPE.

Remove all debris, dirt, rubbish and excess material accumulated as a result of the installation of this equipment and leave casework clean and orderly.

PROTECTION:

General Contractor and installer shall be responsible for protection and security of this equipment after installation of this section is complete. Damage to equipment resulting from the work or acts of other trades or contractors shall not be the responsibility of the casework contractor.

End of Section 114800

SECTION 123050 - LAMINATE CLAD CASEWORKPART 1 - GENERALRELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

The work of this section includes fabrication and installation of fixed modular and flexible rail mounted laminate clad casework and components, fixed and modular countertops and related products furnished by the same supplier for single source responsibility, as shown on drawings, schedules, and specified herein.

Related work specified elsewhere:

Sinks and service fixtures, service and waste lines and all connections, vents, electrical service fixtures, hoods and ducting within or adjacent to casework, or otherwise required: Furnished and installed under Mechanical and Electrical Divisions 15 and 16.

Base molding: Furnished and installed under Finishes Division 9.

Appliances unless specifically noted on drawings as included in this section.

Blocking within walls where indicated.

General millwork, trim, and /or custom cabinetry unless specifically noted on drawings as included in this section.

QUALITY ASSURANCE:

Manufacturers' products shall be publicly catalogued. Manufacturer will show evidence of a minimum of five (5) years experience in providing manufactured casework systems for similar types of projects.

Identification: On a concealed but accessible surface of each item of the work of this Section, plainly stamp an identifying number or numbers, shown on the shop drawings for that item to aid in rapid and efficient identification and reinstallation of removable items, various cabinet work items or items in sections.

REFERENCES:

AWI Quality Standard: Comply with applicable requirements of "Architectural Woodwork Quality Standards", published by the Architectural Woodwork Institute (AWI), except as otherwise indicated.

DEFINITIONS:

Exposed Work: Includes all surfaces visible when doors and drawers are closed.

Bottoms of cases more than 4'-0" above the floor will be considered as exposed.

Visible members in open cases, or behind doors of clear glass will be considered as exposed.

Interior face of doors will be finished as for exposed surfaces.

Semi-Exposed: Includes those members behind opaque doors, such as shelves, divisions, interior faces of ends, case backs, drawer sides, drawer bottoms.

Tops of cases 6'-6" or more above the floor will be considered as semi-exposed.

Concealed Work: Includes sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

SUBMITTALS:

Shop Drawings: Submit shop drawings showing location of each item, dimensioned plans and elevations, large scale details, attachment devices and other components. Include identifying numbers.

Samples: Submit the following for approval or selection:

Finish Hardware

Laminated Plastic

Full size sample for evaluation prior to approval. Approved sample shall be retained by Architect until completion of project.

PRODUCT DELIVERY, STORAGE AND HANDLING:

Protect cabinet work during transit, delivery, storage and handling to prevent damage, soiling and deterioration.

Do not deliver until painting, wet work, grinding and similar operations which could damage, soil or deteriorate cabinet work have been completed in installation areas. If, due to unforeseen circumstances, cabinet work must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas. Store in ventilated space protected from weather with a relative humidity range of 20% to 50%.

PART 2 - PRODUCTS

BASIC MATERIALS AND FABRICATION METHODS:

General: Except as otherwise indicated, comply with following requirements for cabinet work.

Pre-Cut Openings: Fabricate cabinet work with pre-cut openings, where possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams for proper size and shape. Smooth edges of cutoffs and, where located in countertops and similar exposures seal edges of cutouts with a water-resistant coating. Where openings are cut in field, all cut shall be made by casework installer. Size and location of cut-outs shall be coordinated with trade requiring opening.

Measurements: Before proceeding with fabrication of cabinet work required to be fitted to other construction, obtain measurements and verify dimensions and shop drawing details as required for accurate fit.

Cabinet construction shall conform to full overlay design.

Core Material:

Framing lumber not exposed: No.1 poplar, or SYP S4S.

Plywood: AB equivalent plywood laminating panel shall be used for cabinet backs and drawer bottoms.

Particle Board: High density particleboard minimum 50 PCF or greater, for cabinet boxes only.

All counter tops shall be roll-formed particle board with integral 4" backsplash. Ends of counters shall receive ¾" thick particle board backsplash at walls. Cope backsplash to counter and integral backsplash. Bases shall be pressure treated 2X as specified.

Decorative Laminates:

Provide high pressure laminate in grades indicated for the following types of surfaces:

Counter Tops: High-pressure decorative laminate GP50 (.050), NEMA Test LD-3-1995.

Vertical Surfaces: High-pressure decorative laminate GP28 (.028), NEMA Test LD-3-1995.

Cabinet Liner: High-pressure cabinet liner CL20 (.020), NEMA Test LD-3-1995.

Backer Sheet: High-pressure backer BK20 (.20)

Colors:

Countertops: Wilsonart #4656-60 "Bronze Legacy"
Formica #7698-58 "Ashen Ceramic" Matte Finish
Nevamar #MR2005T "Taupe Matrix"

Cabinets: Wilsonart #D327-60 "Pepperdust"
Formica #929-58 "Oyster Gray" Matte Finish
Nevamar #S6018T "Chinchilla"

Cabinet Interior Surfaces: White Cabinet Liner acceptable for semi-exposed backs and sides.

Architect shall select minimum of three (3) additional colors from plastic laminate manufacturer's full line of colors.

ACCEPTABLE MANUFACTURERS:

For the purpose of determining minimum performance and quality standards, this specification is based upon TMI fixed modular casework as manufactured by TMI SYSTEMS DESIGN CORPORATION.

Additional acceptable manufacturers complying with this specification are: Stevens Industries; South Side Manufacturing, Inc.; Phipps Cabinets, Inc.; The Braley Company; Atlanta Casework Systems, Inc.; Case Systems; Habersham Casework, Inc.; Nycom; and Commercial Casework, Inc. and Harwill Fixtures

FINISH FOR CABINET WORK:

General: The entire finish of cabinet work is work of this section.

Exterior Finish-Exposed Areas: All exposed surfaces shall be plastic laminate covered.

Interior Finish - Semi-Exposed Areas: All semi-exposed surfaces shall be plastic laminate covered. Cabinet drawer bottoms shall to be lined. Hardboard or plywood backs receive plastic laminate.

CABINET HARDWARE AND ACCESSORY MATERIALS:

General: Provide cabinet hardware and accessory materials associated with cabinet work.

Hardware Standards: Except as otherwise indicated, comply with ANSI A156.9 "American National Standard for Cabinet Hardware" and ADA.

Drawer Slides: Blum BF230E, epoxy coated, 75 lb., heavy duty slides with built-in positive stop both directions and self-closing feature.

Pulls: Four inch wire type, Stanley, #4484-26D

Hinges: Five knuckle, wrap around type, Stanley #1592 - US26D

Magnetic Catches: Epco # 592

Adjustable Shelf Standards/clips: Manufacturer's standard heavy duty, double pin supports engaging top and bottom of shelf and designed for use with line bored cabinet components. Provide minimum four (4) supports per shelf.

Toe Kick at H.C. Doors: At sinks in base cabinets requiring Handicap access, provide base cabinet doors utilizing polystyrene toe kicks as manufactured by Moore Technologies, Inc.

Installation:

Drawer Slides: Two per drawer.

Pulls: One per door or drawer. Provide two pulls on drawers over 24 inches in width.

Hinges: Two per cabinet door.

Magnetic Catches: One per door.

Locks: For cabinet doors and drawers as shown on drawings, provide National Lock #M4-7054C, removable core, disc tumbler, cam style lock with strike. Provide lock on all clinic cabinet doors and drawers except at sink doors.

FABRICATION:

Fabricate casework, countertops and related products to dimensions, profiles, and details shown on drawings.

All base cabinets and free standing cabinets shall be fabricated to be set on pressure treated 2 x sub-bases as detailed on the drawings casework manufacturer shall fabricate exposed cabinet ends to cover 2 x sub-base.

All counter tops shall be roll-formed particle board with integral 4" backsplash.

All end panels and dividers shall be ¾" thick plywood.

All doors up to 42" high shall be ¾" plywood. Doors over 42" high shall be 1" thick plywood.

All backs against walls shall be 1/4" thick hardboard or plywood.

All cabinet backs exposed on backside shall be 3/4" thick plywood.

All backsplashes shall be 3/4" thick plywood.

All shelving up to 30" wide shall be 3/4" thick plywood. Shelving over 30" wide shall be 1" thick plywood.

All doors shall be edge banded with 3mm black PVC, machine applied with waterproof hot melt adhesive. Outside corners shall be profiled to a 1/8" radius.

PLUMBING AND ELECTRICAL:

Plumbing and electrical work in the cabinet work will be furnished and installed under other Sections. The cabinet manufacturer shall cut all holes required and coordinate the plumbing and electrical installation.

PART 3-EXECUTION

PREPARATION:

Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.

Prior to installation of cabinet work, examine shop fabricated work for completion and complete work as required,

INSTALLATION:

All work shall be shop assembled complete with hardware except items too large for entrance may be in attachable sections for job site connection.

All cabinet and counters shall be accurately cut and fitted, blocked, nailed and glued.

Cabinet manufacturer shall cut all holes for sinks and other accessories.

Doors shall be trimmed and fitted without binding. Hardware for doors shall be fitted to close without binding.

All 2 x bases shall be painted black.

Install casework with factory trained supervision authorized by the manufacturer.

Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops); and with 1/16" maximum offset in flush adjoining surfaces, 1/8" maximum offsets in revealed adjoining surfaces.

Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

Cabinet Work: Install without distortion so that doors and drawers will fit openings properly and be accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated. Lubricate hardware as recommended by the manufacturer.

Install all cabinet end-splashes in a full bed of sealant between top and splash.

ADJUSTMENT, CLEANING, FINISHING AND PROTECTION:

Repair or remove and replace defective work as directed upon completion of installation.

Clean hardware, lubricate and make final adjustments for proper operation.

Clean cabinet work on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

End of Section 123050

SECTION 151000 - PLUMBING

PART 1 - GENERAL

1.1 CODES

- A. Work covered by this section of the specifications shall conform to the International Plumbing Code, 2018 Edition with 2020 Georgia State Amendments, and the International Fuel Gas Code, 2018 Edition with 2020 Georgia State Amendments.
- B. Pipe, pipe fittings, joint, valves, faucets, and fixture fittings utilized to supply water for drinking or cooking purposes shall comply with NSF 372 and shall have a weighted average lead content of 0.25 percent lead or less.

1.2 SUBMITTALS

- A. Where equipment is specified herein or on drawings, by manufacturer's names or numbers, this shall denote minimum requirements as to quality, type, capacity, function, and performance. All equipment must have the Engineer's approval before ordering.
- B. Submittals shall be submitted in electronic *.pdf format. File name shall include the job name, specification section and date of the submittal. Submittals containing multiple items must include a table of contents with hyperlinks to the cover page for each item. The cover page for each piece of equipment shall itemize equipment features to show compliance with or deviation from the requirements contained in the specifications and drawings. If the supporting product data is more than ten (10) pages long, include hyperlinks on the item's cover page to the supporting information.

1.3 OPERATING INSTRUCTIONS

- A. The contractor shall furnish not less than three(3) copies of operating and maintenance instructions for all equipment he has furnished and installed.
- B. Manuals shall be in durable 3 ring binders with the job name, General Contractors and sub-contractors names, addresses, contact information, and general description of the contents on the front cover and side spline.
- C. Product data shall be grouped into logical groups and divided with tab type dividers. An index shall be provided. The index and dividers shall be numbered for quick reference. See Specification section 01700 for additional requirements.

1.4 INSPECTIONS

- A. All cleanouts shall be opened for final inspection and then re-closed.

- B. TV camera inspection of all interior and exterior storm and sanitary sewer lines shall be made with the owner present. All lines shall be inspected and recorded at the end of the project. Interior lines shall be inspected and recorded before slab is poured.

1.5 UTILITY CONNECTIONS

- A. Connect to existing utilities at the locations shown on the drawings.

PART 2 - PRODUCTS

2.1 PIPING MATERIAL

- A. Sanitary and storm water piping above grade within the building shall be hubless cast iron pipe and fittings conforming to ASTM A888.
- B. Sanitary and storm water piping below grade within the building and to 5 feet out from the building shall be schedule 40 PVC plastic drainage pipe and fittings conforming to ASTM 2665. The joint connecting the PVC pipe to the cast iron pipe above shall be made above the slab in such a manner that no PVC pipe is visible.
- C. Sanitary piping below grade, 6" and smaller, outside the building where there is less than 7'-0" of cover in paved areas or less than 4'-0" of cover in non-paved areas shall be service weight hub & spigot cast iron pipe and fittings conforming to ASTM A-74 or ductile iron pipe and fittings conforming to AWWA C110.
- D. Sanitary and storm water piping below grade, 6" and smaller, outside the building where there is a minimum of 7'-0" of cover in paved areas or a minimum of 4'-0" of cover in non-paved areas shall be type SDR-35 PVC drainage pipe and fittings conforming to ASTM D-3034.
- E. Sanitary piping below grade, 8" and larger, 5'-0" beyond the building where there is a minimum of 7'-0" of cover in paved areas or a minimum of 4'-0" of cover in non-paved areas shall be type SDR-35 PVC drainage pipe and fittings conforming to ASTM D-3034.
- F. Sanitary piping below grade, 8" and larger, 5'-0" beyond the building where there is less than 7'-0" of cover in paved areas or less than 4'-0" of cover in non-paved areas shall be ductile iron pipe and fittings conforming to AWWA C110.
- G. Sanitary forced main piping below grade, outside the building shall be type SDR-21 PVC pipe and fittings conforming to ASTM D-1785 with a pressure rating of 200 psi.
- H. Domestic water service pipe installed under the building floor slab and underground, outside the building, 3" and less shall be Type "K" hard drawn copper tubing with wrought copper solder joint fittings conforming to ASTM B-88. Minimum depth of cover outside the building shall be 36".

- I. Domestic water pipe installed under the building floor slab and underground, outside the building, 4" and larger shall be cement lined ductile iron pipe conforming to AWWA C151. Minimum depth of cover outside the building shall be 36".
- J. Domestic water piping 2" and smaller, installed under the floor slab shall be Type "K" soft drawn copper tubing installed with no joints under the slab.
- K. Domestic hot and cold water lines within the building, above grade shall be Type "L" hard drawn copper tubing with wrought copper solder joint fittings conforming to ASTM B-88.
- L. Gas piping installed above grade shall be schedule 40 black steel pipe conforming to ASTM A-53. Gas piping 2" and larger shall have welded joints with carbon steel weld fittings. Gas piping smaller than 2" may have threaded joints with malleable iron 150 lb. threaded fittings.
- M. Install warning tapes 12" above all underground piping. Warning tapes shall have a metallic core to make them detectable. Warning tape shall be Brady 91603(blue) for water lines, 91604(green) for sanitary and storm sewer lines and 91600(yellow) for gas lines or approved equal by Seton or T&B Westline. Warning tape shall rise out of the ground and be accessible at the building wall or other outside location.

2.2 PIPE JOINTS

- A. Joints in hubless cast iron soil pipe above grade shall be made with an elastomeric sealing sleeve conforming to ASTM C-564 and with four 304 stainless steel clamps per joint on sizes 2" through 4" and six per joint on sizes 5" and larger conforming to ASTM C1540.
- B. Joints in hub & spigot ductile soil pipe below grade shall be made with a compression gasket conforming to ASTM C 564.
- C. Joints in exterior below grade copper pipe shall be made with silver solder or brazed connections.
- D. Joints in ductile iron water and sewer pipe shall be Tyton joints except that joints at fittings in water lines shall be bolted mechanical joints.
- E. Joints in schedule 40 PVC plastic pipe shall be made with PVC solvent cement conforming to ASTM D-2564.
- F. Joints in type SDR-35 PVC plastic pipe shall be made with a compression gasket conforming to ASTM F-477.
- G. Joints in copper pipe shall be made with lead free solder containing tin-copper-silver or 95-5 tin-antimony.

- H. In lieu of soldered fittings in copper pipe the contractor may substitute grooved mechanical couplings, press type fittings with EPDM O-rings or mechanically formed fittings with brazed connections. Each of these systems shall be used in accordance with the manufacturer's published instructions.
- I. Connections of copper pipe to ferrous pipe and/or equipment shall be made with dielectric unions.
- J. Joints in ductile iron water pipe shall be Tyton joints except that joints at fittings shall be bolted mechanical joints.
- K. Threaded pipe joints shall have American Standard tapered pipe threads properly formed. Pipe joints compound shall be used in making joints.
- L. Welded joints shall be made with the use of electric arc or of acetylene gas. Welding rods shall conform to ASTM Specifications No. A-251. Welding electrodes shall conform to ASTM Specification No. A-233. Welders shall be certified pipe welders that have passed qualification test prescribed by the National Certified Pipe Welding Bureau.
- M. In lieu of threaded and welded fittings up to 4" in steel gas pipe the contractor may substitute Viega MegaPessG, press type fittings. This system shall be used in accordance with the manufacturer's published instructions.
- N. Unions shall be installed in pipe lines at connections to equipment.

2.3 HANGERS AND SUPPORTS

- A. Cast iron, ductile or plastic pipe underground shall be firmly bedded on the body of the pipe, and bell holes provided at each joint. All piping shall be installed in graded trench. Excavate, backfill, and support piping as hereinbefore specified.
- B. Horizontal runs of cast iron piping installed above ground shall be supported near or at each hub, not including fittings at intervals of not more than 5'0". Hangers shall be B-Line Fig. 3100 standard clevis hanger or approved equal by Empire, Grinnell, Michigan or PHD.
- C. Horizontal runs of plastic piping installed above ground shall be supported near or at each hub, not including fittings at intervals of not more than 4'0". Hangers shall be B-Line Fig. 3100 standard clevis hanger or approved equal by Empire, Grinnell, Michigan or PHD.
- D. Copper piping shall be supported at intervals not to exceed 6'0" for sizes 1-1/2" and smaller, and at intervals not to exceed 10'0" for sizes 2" and larger, and at each change in horizontal or vertical direction. Hangers shall be B-Line Fig. 3170 adjustable swivel ring hangers or approved equal by Empire, Grinnell, Michigan or PHD.
- E. Copper piping in chases shall be secured to the wall with pipe straps or to other piping with lengths of strut system channel as manufactured by Empire, B-Line, Uni-Strut or Michigan.

- F. Copper piping secured to the wall above ceiling shall be secured with lengths of strut system channel as manufactured by Empire, B-Line, Uni-Strut or Michigan.
- G. Steel piping shall be supported at intervals not to exceed 6'-0" for sizes 1-1/2" and smaller and 10'-0" for sizes 2" and larger and at each change in horizontal or vertical direction. Hangers shall be B-Line Fig. 3100 standard clevis hanger or approved equal by Grinnell, Michigan or PHD. Vertical risers shall be supported at each floor with B-Line Fig. 3373 riser clamp or approved equal by Empire, Grinnell, Michigan or PHD.
- H. Hangers shall be supported from building structure by means of beam clamps. Hanger rods shall be standard bolt steel with machine screw threads.
- I. Piping rising through the roof shall be secured to the structure to prevent movement at the flashing or roof curb.
- J. Hangers on insulated piping shall be increased in size to fit over the insulation.
- K. Gas piping installed on the roof shall be supported on Miro Industries 3-RAH-8 pillow block pipestands and support pad installed at a maximum of 10 feet on center. The pipestands shall be constructed of polycarbonate resin plastic. Approved equal by MAPA, Pate, RPS, EAS or Rooftop Blox.
- L. Gas piping rising on the exterior of the building shall be secured to the wall with pipe straps lengths of strut system channel as manufactured by Empire, B-Line, Uni-Strut or Michigan

2.4 VALVES AND COCKS

- A. Unless specifically indicated otherwise, the valves shall be designed for not less than 125 pounds working pressure. The valves shall be suitable for the service for which they are installed.
- B. Gate valves for copper water lines shall be Milwaukee Fig. 115 bronze valve with non-rising stem and sweat ends or approved equal by Crane, Hammond, Jomar, Kitz, Nibco, Stockham or Watts.
- C. Check valves for copper water lines shall be Milwaukee Fig. 1509-S bronze valve with Buna-N disc and sweat ends or approved equal by Apollo, Crane, Hammond, Jomar, Kitz, Nibco, Stockham or Watts.
- D. Ball valves for copper water lines shall be Milwaukee Fig. BA150 bronze valve with PFTE seat, sweat ends or approved equal by Apollo, Crane, Hammond, Jomar, Kitz, Nibco, Stockham or Watts. Ball valves may be substituted for gate valves throughout the system.
- E. Balancing valves for copper water lines shall be Milwaukee Fig. BA150MS bronze ball valve with memory stop PFTE seat, sweat ends or approved equal by Crane, Hammond, Jomar, Kitz, Nibco, Stockham or Watts.

- F. Thermal balancing valves for copper hot water recirculation lines shall be Caleffi 116 series Thermosetter balancing valve or approved equal by Danfloss or Kemper.
- G. Ball valves for steel lines shall be Milwaukee Fig. BA190 bronze valve with PTFE seat and threaded ends or approved equal by Apollo, Crane, Hammond, Jomar, Kitz, Nibco, Stockham or Watts.
- H. Hose bibbs shall be Woodford No. 84 cast brass hose bibb with chrome finish, lock shield cap, loose key and integral backflow preventor or approved equal by Prier, Mifab, Watts or Zurn. Install 16" above floor under lavatories.
- I. Wall hydrants shall be Jay R. Smith 5509RB freezeproof cast brass self draining wall hydrant with lock shield cap, loose key, stainless steel box, rough brass finish front and integral backflow preventor or approved equal by Josam, Mifab, Wade, Woodford or Zurn.
- J. Wall hydrants shall be Woodford Model 25C-4" freezeproof cast brass self draining faucet with NIDEL model 34HA vacuum breaker or approved equal by Josam, J.R. Smith, Mifab, Wade or Zurn.
- K. Roof hydrants shall be Woodford model RHY-2 freeze-proof roof hydrant with ASSE 1052 double check backflow preventor, 1/8" drain hole, hydrant support and under deck flange or approved equal by MAPA or Josam.
- L. Water pressure reducing valves shall be of sizes indicated on the drawings and shall be as manufactured by Watts or approved equal by Apollo, Wilkins or Hersey. Install a 4-1/2" Dia. 0-150 psi pressure gauges with cock at the pressure reducing valve as indicated on the drawings.
- M. Pressure relief valve shall be Watts No. 53 all bronze relief valve with pressure rating of 75 PSI or approved equal by Wilkins or Hersey.
- N. Valve boxes shall be of cast iron with plug cover marked for the service.
- O. Gas valves 3/4" to 2" shall be Milwaukee BB2-100 bronze butterfly valve with full nominal pipe size disc, Viton seals and threaded ends. Gas valves shall be rated at 125 psi and shall be CSA and UL listed for natural gas service. Approved equal gas valves by Apollo, Jomar, Kitz or Nibco are acceptable.
- P. Gas valves 2-1/2" and larger shall be Rockwell-Nordstrom Fig. 143 flanged 2-bolt cover semi-steel valves rated at 175 PSI. Approved equal gas valves by Homestead, Milwaukee or Resun are acceptable.
- Q. Gas pressure regulators shall be Sensus model 143, 243 or 496 as indicated on the drawings or approved equal by Honeywell, Maxitrol, or Pietro Fiorentini.

2.5 DRAINS

- A. Drains installed in floors with water proofing membrane shall have flashing clamps. Floor drain strainer sizes shall be not less than twice the diameter of the drain outlet. Provide trap primer connections where trap primers are indicated on the drawings. All floor drains except those with trap primers or those on safe waste system in the kitchen shall have deep seal p-traps with a minimum of 4" water seal.
- B. Floor drains shall be as follows:
 - 1. Type A: J. R. Smith 2005B cast iron drain, 6 X 6 square Nickaloy strainer.
 - 2. Type E: J. R. Smith 3200 cast iron flanged receptor with 16-1/2" square nickel bronze rim and secured grate, acid resistant coated interior, aluminum dome bottom strainer.
- C. Roof drains shall be J. R. Smith SQ-1-3674 cast iron drain with cast iron dome, roof insulation extension, underdeck clamp, flashing clamp and gravel stop and no-hub outlet.
- D. Overflow roof drains shall be constructed of lead flashing material as detailed on the Architectural drawings.
- E. Downspout nozzles shall be J. R. Smith 1770PB-BS polished bronze nozzles with brass strainer.
- F. Approved equal drains as manufactured by Aco, Josam, Mifab, Sioux Chief, Wade, Watts or Zurn will be acceptable.

2.6 CLEANOUTS

- A. Cleanouts in floor slab shall be J. R. Smith 4000 adjustable head, cast iron cleanout with nickel alloy rim and scoriated nickel alloy cover, countersunk brass plug, Speedi-set seal, installed flush with finished floor. Install Fig. 4051 square top cleanouts in tile floors. Install Fig. 4191 in Terrazzo floors. Install Fig. 4031 round top cleanouts in all other floors. Install suffix X adjustable carpet flange on all cleanouts in carpeted floors.
- B. Cleanouts in walls shall be J. R. Smith 4472 cadmium plug and stainless steel cover, installed on hubless cast iron cleanout tee.
- C. Cleanouts in exterior, below grade cast iron /ductile iron piping shall be J. R. Smith 4283 cleanout with screwed countersunk brass plug, brought up to grade with cast iron pipe riser and set in 18"x 18" x 6" thick concrete pad.

- D. Cleanouts in exterior, below grade PVC piping shall be PVC plastic cleanout with brass screwed countersunk plug, brought up to grade with plastic pipe riser and set in 18"x 18" x 6" thick concrete pad.
- E. Cleanouts in exterior paved area shall be protected from vehicle damage with J. R. Smith 4263 cleanout housing. Lower flange shall be set in 18"x 18" x 4" thick concrete pad ring. Housing shall be completely free of piping so that no loading is transferred to piping.
- F. All cleanouts shall be accessible.
- G. Approved equal cleanouts as manufactured by Josam, Mifab, Sioux Chief, Wade, Watts or Zurn will be acceptable.

2.7 TRAP PRIMERS

- A. Trap primers shall be installed at all floor drains.
- B. Trap primers for P-traps installed above ceilings to receive condensate and at floor drains in Mechanical Rooms, Janitors Closets and other spaces where there are no lavatories shall be Precision Plumbing Products, Inc., Model SP-500-24V electronic trap priming assembly consisting of a solenoid valve rated at 24 volts, 6.3 watts, an air gap and mounting bracket. Provide distribution units where shown on the drawings. Omit the 6 foot electric cord. Wiring for trap primers is provided in ATC & EMS Section.
- C. Trap primers for floor drains in toilet areas with lavatories shall be J. R. Smith Fig. 2698 waste water trap primer P-trap. P-trap and supply line shall be chrome plated and fitted with escutcheon plates. Provide this fitting in lieu of standard P-trap at lavatories which prime the floor drains at locations indicated on the drawings.
- D. Trap primers shall be as manufactured by Josam, J.R. Smith, Mifab, Precision Plumbing, Wade, Watts or Zurn.

2.8 WATER HAMMER ARRESTERS

- A. Water hammer arresters shall be furnished and installed where indicated on the drawings. Sizes indicated refer to standards established by the Plumbing and Drainage Institute and published in Standard PDI-WH-201. Arresters shall be certified that they conform to this standard.
- B. Water hammer arresters shall be as manufactured by Josam, Precision Products, J.R. Smith, Mifab, Sioux Chief, Wade, Watts, or Zurn.

2.9 SLEEVES

- A. Pipe sleeves or core drilled holes shall be provided in all locations where piping passes through concrete floors above grade or masonry or concrete walls not in place before the piping is installed. Sleeves shall be of steel pipe sections.
- B. Where sleeves are provided in fire rated walls the annular space shall be filled with 3M fire barrier or approved equal material complying with UL 1479 or ASTM E814.
- C. Where cast iron pipes pass through brick or tile walls, sleeves shall be omitted.
- D. Where cast iron or PVC plastic pipes pass through slabs in contact with grade, sleeves shall be omitted.

2.10 FLASHING

- A. At roof drains and vent piping in built-up roofs, flashings shall consist of four pound lead extending not less than 12" in all directions from the edge of drain flange. The flashing material shall be placed underneath the roof material and together with the roofing membrane be placed under and attached to drain with flashing clamping ring.
- B. The flashing roof connections shall meet the approval of the roofing material manufacturer, and shall comply with the roof bond requirement.
- C. Roof drain and vent pipe flashing shall be TPO membrane provided and installed by roofing contractor.

2.11 INSULATION

- A. All insulation shall have composite maximum flame spread rating of 25 and maximum smoke developed index of 50 as required by NFPA 90A. Accessories, such as adhesives, mastics, cements, or tapes shall have the same component ratings as listed above.
- B. Hot and cold water piping shall be insulated with fiberglass pipe insulation with type ASJ all service jacket with pressure sensitive tape closure system or elastomeric closed cell or polyolefin or polymer foam, all with self-sealing seam and adhesive sealed joints. Each type of insulation shall be installed in accordance with the manufacturer's published instructions. All joints shall be miter cut and sealed. Insulation shall have a k factor not to exceed 0.27 @ 75°F. Insulation shall be 1/2" thick except that insulation on circulating mains, shall be 1" thick.
- C. Exposed fixture connections and piping concealed inside walls or chases shall not be insulated.

- D. Pipe clamps shall be increased in size to fit over insulation. At each pipe hanger install a 12" long, 22 gauge galvanized steel saddle to protect insulation.
- E. Hot and cold water piping secured to wall above ceiling with Unistrut clamping system shall use UL 2043 rated Klo-Shure Unistrut insulation coupling clamps.
- F. Storm water piping, including the roof drain, concealed above ceilings shall be insulated with 1-1/2" thick 0.75 PCF density fiberglass blanket insulation with aluminum foil vapor barrier. All joints and seams shall be sealed with 3" wide aluminum foil tape.
- G. Storm water piping exposed to view shall be insulated with fiberglass pipe insulation with type ASJ all service jacket with pressure sensitive tape closure system or elastomeric closed cell or polyolefin or polymer foam, all with self-sealing seam and adhesive sealed joints. Each type of insulation shall be installed in accordance with the manufacturer's published instructions. All joints shall be miter cut and sealed. Insulation shall have a k factor not to exceed 0.27 @ 75°F. Insulation shall be 1/2" thick. Roof drains shall be insulated with 1-1/2" thick 0.75 PCF density fiberglass blanket insulation with aluminum foil vapor barrier. All joints and seams shall be sealed with 3" wide aluminum foil tape.
- H. Horizontal waste lines above grade which carry condensate shall be insulated with 1-1/2" thick 0.75 PCF density fiberglass blanket insulation with aluminum foil vapor barrier. All joints and seams shall be sealed with 3" wide aluminum foil tape.

2.12 FIXTURE WASTE CONNECTIONS

- A. Waste connections to fixtures shall be as follows:
 - 1. Water closet: For closets on slab on grade or above grade, use 4" stub with cast iron closet floor flange. For wall hung, back outlet closets use cast iron carriers as specified with fixture. Use pre-formed wax setting ring to make joints water and gas tight.
 - 2. Lavatories: 1-1/4" Type M copper tubing with cast brass drainage fittings.
 - 3. Urinal: 2" schedule 40 PVC.
 - 4. Sink: 1-1/2" Type M copper tubing with cast brass drainage fittings.
 - 5. Drinking Fountain: 1-1/4" Type M copper tubing with cast brass drainage fittings.
 - 6. Kitchen Equipment Waste Connections: Provide waste connections from all kitchen equipment drains to hub drains, floor drains, and waste piping indicated on either the plumbing drawings or the kitchen equipment drawings. Connections shall be made with type "L" or DWV copper with long radius wrought copper fittings and solder joints. All connections shall conform to code requirements.

- B. Connections shall be made to all equipment and fixtures furnished under other sections of these specifications.

2.13 PLUMBING FIXTURES

- A. Furnish and install all plumbing fixtures complete with all equipment, fittings, trimming, and accessories, as shown or specified. Unless otherwise indicated, Zurn fixtures and seats are used as a guide and the plate numbers are those given in their catalog.
- B. China fixtures shall be manufactured by American Standard, Eljer, Kohler, Sloan or Zurn.
- C. Stainless steel sinks shall be manufactured by Acorn, Elkay, Encore, Just or Kindred.
- D. Stainless steel or terrazzo wash fountains and mop basins shall be manufactured by Acorn, Bradley, Fiat or Williams.
- E. Seats as manufactured by Bemis, Beneke, Centoco, Church, Olsonite, Sperzel or Zurn will be acceptable. Seats shall include Bemis STA-TITE mounting hardware.
- F. Faucets as manufactured by American Standard, Chicago, Delta HDF, Encore, Moen, Sloan, Speakman, Symmons, T&S or Zurn are acceptable.
- G. Flush valves as manufactured by Zurn, American Standard, Moen or Sloan will be acceptable. Flush valve shall be diaphragm type.
- H. Fixture supplies and P-traps shall be as manufactured by Brasscraft, Keeney, McGuire, Dearborn, EBC or Zurn/Sanitary-Dash.
- I. Insulation safety covers for ADA accessible lavatory and sink drains and water pipes shall be white PVC resin. The covers shall resist thermal transfer, be antimicrobial and ADA compliant. Additional waste and hot and cold water piping not covered by pre-manufactured PVC resin covers shall be insulated with fiberglass pipe insulation with type ASJ ass service jacket with pressure sensitive tape closure system or elastomeric closed cell or polyolefin or polymer foam, all with self-sealing seam and adhesive sealed joints.
- J. Drinking Fountains shall be as manufactured by Elkay or approved equal by Halsey Taylor, Haws or Sunroc.
- K. Carriers and Interceptor traps shall be as manufactured by J. R. Smith, or approved equal by Josam, Mifab, Wade, Watts or Zurn.
- L. Emergency shower/eye wash fixtures shall be as manufactured by Haws or approved equal by Acorn, Bradley, Econ, Guardian, Laboratory Enterprises or Speakman are acceptable.

- M. Where trap primers for floor drains in toilet areas are indicated on the drawings, omit the McGuire P-traps specified with the fixture and provide a J. R. Smith 2698 trap primer P-trap.
- N. Provide plumbing fixtures as described below:
- P-1 Water closet: Zurn Z5655 vitreous china elongated 1.28 gpf siphon-jet action closet with bolt caps, Z6000-AV-HET flush valve with YK solid ring wall brace, Z5955SS-ST5-EL white open front seat with self-sustaining check hinge and stainless steel hinge post.
- P-1a Water closet (18" high): Zurn Z5665 18" high vitreous china elongated 1.28 gpf siphon-jet action closet with bolt caps, Z6000-AV-HET flush valve with YK solid ring wall brace, Z5955SS-ST5-EL white open front seat with self-sustaining check hinge and stainless steel hinge post.
- P-1b Water closet: Zurn Z5615-HET wall mounted vitreous china elongated 1.28 gpf siphon-jet action closet with Z6000-AV-HET flush valve with YK solid ring wall brace, Z5955SS-ST5-EL white open front seat with self-sustaining check hinge and stainless steel hinge post. Provide J. R. Smith Fig. 210 or 230L, R or D adjustable carrier.
- P-1c Water closet (Barrier Free): Same as fixture P-1b except installed at 18" to rim for handicapped use. Provide J. R. Smith Fig. 115 or 175 L, R or D high-set adjustable carrier.
- P-2 Lavatory: Zurn Z5344 20" x 18" vitreous china lavatory (4" centers) with wall hanger, Z8100-VRG chrome vandal resistant single lever faucet less pop-up drain and holes with ceramic disc, temperature limit stop, 0.5 gpm aerator, Z8743 1-1/4" drain with grid strainer, McGuire 8872 1-1/4" 17 gauge chrome P-trap, two McGuire 170SS-LK-LK3/8" O.D. chrome supplies with angle stops & stainless steel braided flexible risers. Provide J. R. Smith Fig. 0700 floor mounted carrier with concealed arms. Mount 29" to bottom to clear wheelchair. Provide insulation safety covers on drain and hot and cold water supplies.
- P-2a Lavatory: Zurn Z5344 20" x 18" vitreous china lavatory (4" centers) with wall hanger, Z8743 1-1/4" drain with grid strainer, Z82701 single lever cold water faucet with 0.5 gpm aerator, P6900-CP4 4" cover plate assembly, McGuire 8872 1-1/4" 17 gauge chrome plated P-trap, McGuire 170SS-LK-LK3/8" O.D. chrome plated supply with angle stop & stainless steel braided flexible riser. Provide J. R. Smith Fig. 0700 floor mounted carrier with concealed arms.
- P-2b Lavatory (Barrier Free): Same as fixture P-2b except mounted 29" to bottom to clear wheelchair. Provide insulation safety covers on drain and cold water supply.

- P-2c Lavatory (Health Care Barrier Free): Zurn Z5344 20" x 18" vitreous china lavatory (4" centers), Z812A4 centerset faucet with 3 ½" gooseneck, 4" wrist blade handles, Z8743 1 1/4" drain with grid strainer, McGuire 8872 1-1/4" 17 gauge chrome p-trap, two McGuire 170SS-LK-LK3/8" O.D. chrome supplies with angle stops and stainless steel braided flexible risers. Provide J.R. Smith Fig. 0700 floor mounted carrier with concealed arms. Mount 29" to bottom of clear wheelchair. Provide insulation safety covers on drain and hot and cold water supplies.
- P-3 Urinal: Zurn Z5755 wall hung siphon jet, 0.5 gpf ultra low consumption, vitreous china urinal with 3/4" top spud, Z60003AV-ULF manual flush valve, 3/4" connection, 2" threaded outlet. Provide J. R. Smith Fig. 635 floor mounted carrier with bearing studs.
- P-3a Urinal (Barrier Free): Same as P-3 except mounted 17" to rim.
- P-4 Mop Basin: Fiat TSB-200 24" x 24" x 12" precast terazzo mop basin with 3" strainer. Install Zurn Z843M1-CS service sink faucet with wall brace, bucket hook, vacuum breaker, check stops and service stops in shanks 36" above floor.
- P-4 Mop Basin: Fiat TSB-3001 32" x 32" x 12" precast terazzo mop basin with 6" drop front, 3" strainer. Install Zurn Z843M1-CS service sink faucet with wall brace, bucket hook, vacuum breaker, check stops and service stops in shanks 36" above floor.
- P-5 Drinking Fountain: Elkay VRCDS wall mounted drinking fountain constructed of 14 gauge stainless steel with vandal resistant push button, vandal resistant bubbler, 3/8" O.D. supply with angle stop, 1-1/4" 17 gauge chrome P-Trap with clean-out plug.
- P-5a Drinking Fountain: Elkay VRCDWSK wall mounted drinking fountain constructed of stainless steel with vandal resistant push button, vandal resistant bubbler, EZH20 bottle filler, 3/8" O.D. supply with angle stop, 1-1/4" 17 gauge chrome P-Trap with clean-out plug.
- P-5b Drinking Fountain: Same as fixture P-5 except mount 36" to top of spout.
- P-6 Workroom Sink: Just SL-ADA-2125-A-GR 21"x25"x6-1/2" deep 18 gauge stainless steel self rimming sink with non-abrasive sound deadener, Chicago 201-AHA8 high spout faucet with 2.0 gpm aerator, Just J35FS flat strainer with 1-1/2" tailpiece, McGuire 8912 1-1/2" chrome plated 17 gauge P-trap, two McGuire 170SS-LK-LK3/8" O.D. chrome supplies with angle stops and stainless steel braided flexible risers. Provide insulation safety covers on drain and hot and cold water supplies on Handicap sinks.

- P-6a Science Sink: Acid resisting sink with gas cock, hot and cold water faucet, 1-1/2 " strainer with tailpiece is furnished under another section of the specification. Provide 3/8" angle stop valves in water lines, 1/2" gas valve in gas line. Provide 1-1/2" acid-resisting P-trap or acid resisting drain to hub drain as shown on drawings.
- P-6b Science Sink-Prep Room: Acid resisting sink with gas cock, hot and cold water faucet, 1-1/2 " strainer with tailpiece is furnished under another section of the specification. Provide 3/8" angle stop valves in water lines, 1/2" gas valve in gas line. Provide 1-1/2" acid-resisting P-trap or acid resisting drain to hub drain as shown on drawings.
- P-6c Fume Hood: Acid resisting sink inside fume hood with gas cock, hot and cold water faucet, 1-1/2" strainer with tailpiece is furnished under another section of the specification. Provide 3/8" angle stop valves in water lines, 1/2" gas valve in gas line. Provide 1-1/2" acid-resisting P-trap or acid resisting drain to hub drain as shown on drawings.
- P-6d Healthcare Sink: Just SL-ADA-2125-A-GR 21"x25"x6-1/2" deep 18 gauge stainless steel self-rimming sink with non-abrasive sound deadener, Chicago 786-E29ABCP gooseneck faucet with 2.0 gpm aerator and with 4" wrist handles, Just J35FS flat strainer with 1-1/2" tailpiece, McGuire 8912 1-1/2" P-trap, two McGuire 170SS-LK-LK3/8" O.D. chrome supplies with angle stops and stainless steel braided flexible risers. Provide insulation safety covers on drain and hot and cold water supplies on Handicap sinks.
- P-6e Special Education Sink: Just DL-ADA-2133-A-GR 21"x33"x6-1/2" 18 gauge double compartment stainless steel self-rimming sink with non-abrasive sound deadner, Chicago 200 faucet with 8" high swing spout, 2.0 gpm aerator hose with spray aerator and 4" wrist handles, two Just J35FS flat strainer, two chrome plated tailpieces, McGuire 113 1-1/2" chrome plated continuous waste, McGuire 8912 1-1/2" chrome plated 17 gauge P-trap, two McGuire 170SS-LK-LK3/8" O.D. chrome supplies with angle stops and stainless steel braided flexible risers. Provide insulation safety covers on drain and hot and cold water supplies on Handicap sinks.
- P-7 Shower/Eye Wash Station: Haws 8122H shower with ABS plastic shower head, chrome plated manual shower valve with 28" pull rod and triangular handle, 1" supply connection. Haws 7360BTWC Barrier free wall mounted stainless steel eye wash bowl with ABS plastic spray heads, stainless steel push-flag operated valve 1/2" stainless steel braided flexible supply with stop, 1-1/2" p-trap.
- P-8 Ice Maker Box: IPS Water-Tite 9000 recessed PVC box with 1/2" stop. Approved equal by Oatey or Watts.
- P-9 Washer Connection: IPS Water-Tite W2700HA recessed PVC supply and drain box with two 1/2" quarter turn valves, water hammer arresters and 2" drain. Approved equal by Oatey or Watts.

2.14 ELECTRIC WATER HEATER

- A. Water heater shall be the energy saving automatic electric storage type water heater complete with glass lined tank, foam tank insulation, anode rod, diffuser dip tube, enameled finished exterior casing, low density electric heating elements, water temperature controls, and ASME rated temperature and pressure relief valve. The heater shall comply with ASHRAE 90.1-2004 for energy efficiency.
- B. Water heater shall have a 3 year warranty when used in a commercial building.
- C. Water heater shall be as manufactured by A.O. Smith or approved equal by Bradford-White, Lochinvar, Rheem, Ruud, or State.

2.15 HOT WATER RECIRCULATING PUMP

- B. Hot water recirculating pump shall be an in-the-line, stainless steel booster pump with PES composite impeller and aluminum oxide ceramic shaft and bearings. Direct drive motor shall have built-in thermal overload protection. Pump shall be of the size and capacity indicated on the drawings and shall be as manufactured by Grundfos or approved equal by Taco or Zoeller.

2.16 LIFT STATION WITH DUPLEX SEWAGE PUMPS

- A. Submersible sewage pumps shall have cast iron volute case with 3" discharge flange oil filled motor two-rail lift-out rail system and recessed type pump impeller capable of passing 2" diameter solids.
- B. Motors shall be sealed submersible type filled with dielectric oil. Motors shall have ball bearings designed for 50,000 hours B-10 life. Heat sensors shall be imbedded in the winding and connected in series with the motor starter contactor coil to stop the motor if the winding temperature is above 248°F. Pump-motor shaft shall be 416 stainless steel.
- C. Pump case shall be cast iron. Pump impeller shall be recessed type. The motor shall be protected by two mechanical seals with a seal chamber between the seals. Seal face shall be carbon and ceramic. A double electrode shall be mounted in the seal chamber to detect water in the seal. This electrode shall cause a red light in the control box to turn on when water is detected.
- D. Impeller shall be cast iron of the recessed type., Impeller shall be dynamically balanced. Impeller and motor shall have top lift-out case.
- E. A lift-out rail system shall be provided for each pump. The system shall consist of a ductile iron discharge base, cast iron pump attaching and sealing plate, stainless steel pump guide plate and cast iron elbow. Guide-rails shall be two 2" schedule 40 stainless steel pipes. All bolts and fasteners shall be stainless steel. Provide a PCWI stainless steel lifting chain with enlarged master links.

- F. Piping inside sump pit shall be schedule 40 PVC pipe.
- G. Duplex pumps shall be controlled by an electrical control panel. The panel enclosure shall be NEMA-4X weatherproof panel and shall have a hinged door and a pedestal base. Pumps shall be controlled by a mercury float switch level control.
- H. Main circuit breakers shall be mounted with operating handles through the door and shall have a lock arrangement that prevents the door from being opened when either breaker is in the "ON" position. When breakers are off all power to the control elements shall be killed.
- I. A magnetic motor starter with thermal overload protection shall be provided for starting each pump. An alternator relay shall be provided to alternate pumps on each successive pumping cycle and an override relay shall be used to start both pumps if inflow is greater than one pump can handle and shall start the second pump in case operating pump fails. The operation of the override relay shall also activate the alarm.
- J. H-O-A switches, elapsed time meters, control transformers, alarm switch, alarm contact for Energy Management System, and run lights shall be furnished for each pump.
- K. A terminal strip with box type connectors shall be supplied to make all power and control connections for both pumps. All terminals shall be marked for easy identification. A ground terminal strip shall be provided.
- L. A high water red alarm light shall be mounted on the control panel.
- M. Provide waterproof rubber covered cords for connection between the control panel and the pumps and level controls. Insulation on the cords shall be type SO. Conductors in the cords shall be copper, minimum 3 #12 AWG for pumps and 2 #16 AWG for level controls.
- N. Remote alarm panel shall be flush mounted and shall contain a red alarm light, an alarm horn and a silence switch. Alarm panel shall be installed inside the building in the Administration area.
- O. Check valves shall be constructed with a gray cast iron body and cover and with a hollow steel ball with nitrile rubber exterior. The check valves shall be a full flow, non-clog type with a flow area equal to the nominal size of the valve.
- P. Provide one Halliday Products Model D2B36D portable hoist, all stainless steel construction with 3-1/2" diameter mast, adjustable davit arm, winch, cable and hook. Lifting capacity shall be 1000 lbs. Provide D27 floor style hoist socket for each dosing chamber.
- Q. Pumps and electrical control panel shall be of the size and capacity indicated on the drawings and as manufactured by F.E. Myers Co. or approved equal by Flgyt or Zoeller.

2.17 PIPE MARKERS AND LABELS

- A. All piping installed in mechanical rooms or above accessible ceilings shall be labeled to indicate the system type. Labels shall be installed at 25 feet on center on cold water, hot water and gas piping.
- B. Labels shall be self sticking pipe markers with black letters. Labels shall be W. H. Brady style B-946 or approved equal by Mifab, Seton or T&B Westline.
- C. Install 1/2" diameter red plastic markers on ceiling grid at each shut-off valve concealed above ceiling.
- D. Install 1/2" h x 2" w label the words "Trap Primer" on the ceiling grid at each location where an electronic trap primer serves an above ceiling condensate p-trap drain . Label shall be blue with white letters.

2.18 ELECTRICAL

- A. Power supply and control wiring to equipment furnished under this section will be furnished under the Electrical Section.

PART 3 - EXECUTION

3.1 TRENCHING, BEDDING AND BACKFILLING

- A. All excavation and backfill for work under this section shall be in accordance with Division 2, Site Work.

3.2 TEST

- A. The soil, waste and vent lines of the sanitary systems shall be tested with water at ten feet of water head pressure for 15 minutes or with air at 5 psi for 15 minutes.
- B. The domestic water piping shall be tested with water at a pressure not less than the working pressure of the system for 15 minutes or with air at 50 psi for 15 minutes.
- C. Air testing of plastic piping is prohibited.
- D. Site gravity sewer systems shall be tested with water at ten feet of water head pressure for 15 minutes.

- E. The gas piping shall be tested at a pressure no less than 1-1/2 times the proposed maximum working pressure but no less than 3 psi irrespective of the design pressure; duration of test shall be 1 hour for each 500 cubic feet of piping system volume or fraction thereof.
- F. All underground and concealed lines shall be tested before the lines are covered.

3.3 DISINFECTION

- A. All domestic water piping shall be disinfected with chlorine before it is placed into operation. The chlorinating material shall be liquid chlorine conforming to Federal Specification BB-C-120 and shall be introduced to the system by experienced operators only. The chlorine solution applied to the piping sections or system shall contain at least fifty(50) parts per million of available chlorine and shall remain in the sections or system for a period of not less than twenty-four (24) hours. Alternately: The chlorine solution applied to the piping sections or system shall contain at least two-hundred(200) parts per million of available chlorine and shall remain in the sections or system for a period of not less than three (3) hours. During the disinfection period all valves shall be opened and closed at least four times. After the disinfection period, the chlorinated water shall be flushed from the system with clear water until the residual chlorine content is not greater than two-tenths parts per million (0.2 PPM). Submit certification to the Architect and Owner that the system was disinfected.

3.4 PIPING INSTALLATION

- A. All horizontal soil, waste and vent piping of 2" diameter or less shall be installed with a fall of not less than 1/4" per foot. All horizontal soil, waste and vent piping larger than 2" shall be installed with a fall of not less than 1/8" per foot. All horizontal grease waste shall be installed with a fall of not less than 1/4" per foot. All piping in finished areas shall be concealed in walls, in pipe chases, or above furred ceilings. Except for fixture connections, reductions in pipe sizes shall be made with reducing tees, reducing ells, or reducing couplings.
- B. Cast iron or plastic pipe underground shall be firmly bedded on the body of the pipe, and bell holes provided at each joint. All piping shall be installed in graded trench. Excavate, backfill, and support piping as hereinbefore specified.

3.5 FIXTURE INSTALLATION

- A. Grout all water closets at floor and caulk all lavatories and urinals at walls. Seal all countertop sinks and lavatories with plumber's setting putty.

End of Section 151000

SECTION 153000 - SPRINKLER SYSTEM

PART 1 - GENERAL

1.1 CODES

- A. Work shall conform to NFPA 13 Sprinkler Systems, 2019 Edition and NFPA 24 Installation of Private Fire Service Mains and Their Appurtenances, 2019 Edition. International Fire Code, 2018 Edition with No Georgia State Amendments.

1.2 SPRINKLER SYSTEM

- A. Provide a complete wet pipe sprinkler system in all heated areas of the new building.
- B. Provide outside hydrant protection and fire line main as indicated on the Plumbing Site Plan.
- C. The occupancy classification of the building is light hazard except in specific areas where other classifications are required by NFPA 13. The sprinkler system shall be designed to deliver 0.10 gpm per square foot over an area of 1500 square feet in light hazard areas.
- D. The contractor shall determine the location of all sprinkler heads, arrange and size the sprinkler piping using hydraulic calculation.

1.3 SUBMITTALS

- A. Submit the following information:
 - 1. Water flow test data.
 - 2. Hydraulic Calculations.
 - 3. Materials and equipment lists, manufacturer's data and cut sheets.
 - 4. Shop drawings, including dimensioned plans, sections, details, and elevations showing locations and arrangement of piping, sprinklers, valves, alarms and dampers.
 - 5. Certificate of tests.
- B. The Contractor shall coordinate the arrangement of sprinkler piping exposed to view in finished areas with the Architect and obtain written approval from the Architect for exposed piping configuration prior to submitting a complete set of sprinkler shop drawings to the Engineer for review.

- C. Shop drawings shall be submitted to and approved by the Georgia State Fire Marshal before any work is started.
- D. Submittals shall be submitted in electronic *.pdf format. File name shall include the job name, specification section and date of the submittal. Submittals containing multiple items must include a table of contents with hyperlinks to the cover page for each item. The cover page for each piece of equipment shall itemize equipment features to show compliance with or deviation from the requirements contained in the specifications and drawings. If the supporting product data is more than ten (10) pages long, include hyperlinks on the item's cover page to the supporting information.

1.4 OPERATING INSTRUCTIONS

- A. The Contractor shall furnish not less than three (3) copies of operating and maintenance instructions for all equipment he has furnished and installed.
- B. Manuals shall be in durable 3 ring binders with the job name, General Contractors and sub-contractors names, addresses, contact information, and general description of the contents on the front cover and side spline.
- C. Product data shall be grouped into logical groups and divided with tab type dividers. An index shall be provided. The index and dividers shall be numbered for quick reference. See Specification section 01700 for additional requirements.

1.5 HYDRAULIC CALCULATIONS

- A. The contractor shall perform a water flow test at the site in accordance with the procedure outlined in NFPA 13, Chapter 6.
- B. Hydraulic calculations indicating that the pipe sizes selected will deliver the required water flow density when the sprinkler system is connected to the existing water supply system shall be made by the contractor and submitted for approval.
- C. The calculations must be made using the HASS system or other approved computer program.

1.6 UTILITY CONNECTIONS

- A. Connect to the existing fire line as indicated on the drawings.

1.7 EXCAVATION AND BACKFILL

- A. All excavation and backfill for work under this section shall be in accordance with Division 2 requirements.

PART 2 - PRODUCTS

2.1 INSIDE PIPING

- A. Piping for the sprinkler systems shall be steel pipe manufactured in accordance with ASTM A 120, A135, A795 and A 53. Piping with minimum wall thickness outlined in NFPA 13-2-3 shall be used for pipe sizes greater than 2". Schedule 40 pipe may be used for smaller sizes.

2.2 FITTINGS (INSIDE PIPING)

- A. Pipe shall be joined with cast iron or malleable iron, screwed, flanged or welded steel fittings manufactured in accordance with NFPA 13-2-4 or U.L. listed fittings suitable for grooved pipe couplings. Plain end pipe fittings will not be accepted.
- B. Sprinkler drops may be installed using U.L. listed flexible stainless steel tubing.

2.3 HANGERS

- A. Suitable U.L. listed hangers shall be provided in accordance with NFPA-13-2-6.

2.4 VALVES

- A. OS & Y valves, gate valves, drain valves, post indicator valves and check valves shall be listed by U. L. for use in sprinkler systems.
- B. Auxiliary drains shall be provided where a change in piping direction prevents drainage of system piping through the man drain valve.
- C. Automatic air vent shall be located at the high point in the system to allow air to be removed from that portion of the system.

2.5 UNDERGROUND PIPING

- A. Underground piping shall be cement lined ductile iron pipe manufactured in accordance with ANSI 21.51.
- B. Joints in ductile iron water pipe shall be Tyton joints except that joints at fittings shall be bolted mechanical joints.

2.6 FITTINGS AND COUPLINGS (UNDERGROUND PIPING)

- A. Fitting for underground piping shall be cast iron manufactured in accordance with ANSI A21-10.

2.7 SPRINKLERS

- A. Sprinklers in areas having no suspended ceilings or having gypsum board ceilings fasten directly to the bar joist shall be standard upright, 1/2" or extended coverage 3/4" U.L. listed types having brass finish.
- B. Sprinklers in lay-in ceilings shall be standard small frame surface mounted pendant 1/2" or extended coverage 3/4", U.L. listed types having a chrome finish arranged for surface mounting.
- C. Sprinklers in suspended gypsum board ceiling shall be standard small frame 1/2" or extended coverage 3/4" U.L. listed concealed type with round flat cover.
- D. Sprinklers having an ordinary temperature rating shall be used except in mechanical equipment rooms and near duct outlets where sprinklers having an intermediate rating shall be used.
- E. Sprinklers shall be located in lay-in ceiling tiles in the center of the 24" X 48" tile or at quarter points in the tile, i.e. 12" from one end and 12" from each side. Sprinkler heads shall be arranged symmetrically in each space. Shop drawings shall indicate location of sprinkler heads in ceiling grid and shall show dimensions from sprinkler head to grid system.
- F. A stock of at least 6 spare sprinklers of each type used and a wrench shall be provided in a suitable accessible cabinet in the main valve room of each building.

2.8 ESCUTCHEON PLATES

- A. Escutcheon plates having a chrome finish shall be provided for all exposed wall and ceiling penetrations. Where sprinklers are within 12 inches of surface mounted lighting fixtures, 1 inch deep plates shall be used for standard surface mounted pendant sprinklers.

2.9 INSPECTORS TEST VALVES

- A. Inspectors test valves shall be located at each sprinkler riser and shall discharge into the main sprinkler drain.

2.10 HYDRANTS

- A. Hydrants shall be an AWWA listed type having two 2-1/2" hose outlets and a 4-1/2" pumper outlet with threads compatible with Local Fire Department equipment.

2.11 ALARMS

- A. The wet sprinkler system main riser shall be provided with a U.L. listed wet type swing check valve with drain and gauge connections.
- B. Provide each riser with an electric alarm bell. Provide each riser with two double pole, double throw pressure switches or flow switches and an electric tamper switch. One contact of each pressure switch and the tamper switch is for connection to the fire alarm system. The second contact in the flow switch is for the electric bell. The contact in the second flow switch is for connection to the owner's alarm system.

PART 3 - EXECUTION

3.1 UNDERGROUND PIPING

- A. Underground piping which is used for fire protection shall be installed by a contractor which holds a Georgia Certificate of Competency for Automatic Fire Sprinkler Systems.
- B. Underground piping shall be installed in accordance with NFPA 24-8-1 through 8-7. All tees, plugs, caps and bends shall be anchored with clamps, tie rods and concrete thrust blocks in accordance with NFPA 24-8-6. Piping shall have a minimum of 42" cover above the top of the pipe.
- C. Underground piping shall be thoroughly flushed in accordance with NFPA 24-8-8 prior to the connection of inside piping. All piping shall be hydrostatically pressure tested at 200 psi for at least two hours in accordance with NFPA 24-9.2. The joint Owner-Contractor inspection and test certificates shall be satisfactorily completed and submitted in accordance NFPA-24-A-9-2.1.

3.2 SPRINKLER SYSTEM

- A. The Contractor shall schedule and complete an onsite coordination meeting with the Architect to obtain final approval of exposed sprinkler piping prior to installation.
- B. The sprinkler system shall be coordinated with and arranged to clear all ceiling grid, lighting fixtures, conduit ceiling diffusers, ductwork, piping and mechanical and electrical equipment as shown on the drawings.
- C. Sprinkler piping shall not be installed in service areas of air conditioning units. See mechanical drawings for details locating the service areas. Where conflicts occur, provide offsets in the sprinkler system piping.

- D. Sprinkler piping shall not be installed over the tops of electrical panels and switchboards in areas where piping is prohibited by the National Electrical code.
- E. A sign or placard shall be permanently affixed in the main valve room shall include the following information:
1. Location of the design area or areas
 2. Discharge densities over the design area or areas
 3. Required flow and residual pressure demand at the base of the riser
 4. Occupancy classification or commodity classification and maximum permitted storage height and configuration
 5. Hose stream demand included in addition to the sprinkler demand
- F. A drawing framed under plastic showing the areas of the building served by each sprinkler zone shall be installed in the main valve room adjacent to the riser.

End of Section 153000

SECTION 154000 - HEATING, VENTILATING AND AIR CONDITIONING

PART 1 – GENERAL

1.1 CODES

- A. Work covered by this section of the specifications shall conform to the International Mechanical Code, 2018 Edition with supplemental Georgia State Amendments.

1.2 SUBMITTALS

- A. Where equipment is specified herein or on drawings, by manufacturer's names or numbers, this shall denote minimum requirements as to quality, type, capacity, function, and performance. All equipment must have the Engineer's approval before ordering.
- B. Submittals shall be submitted in electronic *.pdf format. File name shall include the job name, specification section and date of the submittal. Submittals containing multiple items must include a table of contents with hyperlinks or bookmarks to the cover page for each item. The cover page for each piece of equipment shall itemize equipment features to show compliance with or deviation from the requirements contained in the specifications and drawings. If the supporting product data is more than ten (10) pages long, include hyperlinks on the item's cover page to the supporting information.
- C. Submittals shall include an electrical coordination sheet to confirm that the voltages and circuit size requirements of the equipment provided have been coordinated with the electrical drawings and the electrical contractor. Highlight any discrepancies. HVAC and Electrical Contractors shall sign the sheet verifying coordination.

1.3 OPERATING INSTRUCTIONS

- A. The Contractor shall furnish operating and maintenance instructions for all equipment furnished and installed in pdf format as defined in General Conditions.
- B. Product data shall be grouped into logical groups and divided with hyperlinks to the cover page for each item.

1.4 SERVICE

- A. The contractor shall furnish all labor and materials except filters required to properly serve the systems throughout the guarantee period.
- B. The Gwinnett County Public Schools Maintenance Division shall be notified so that maintenance personnel can be present for any service inspection or repair.

1.5 GUARANTEE

- A. The Contractor shall provide guarantees as described herein in addition to those described in the General Conditions of these specifications for the following items:

Refrigeration Compressors - 5 years

Gas Heat Exchangers - 15 years

Cooling tower - 5 years against leakage

Fabric Duct – 5 years

Freight on all warranty parts shall be prepaid.

PART 2 - PRODUCTS

2.1 ROOF-TOP AIR CONDITIONING UNITS

- A. Roof-top air conditioning units shall be a factory assembled air-cooled cooling, gas heating unit in a weatherproof casing mounted on a full perimeter roof curb.
- B. Evaporator fans shall be a forward curved centrifugal with direct drive motors on units 5 ton and smaller and adjustable V-belt drive on units larger than 5 tons. Motors shall have thermal overload protection.
- C. Damper shall have an access door or panel for inspection and service Coils shall be aluminum fin, mechanically bonded to seamless copper tubing.
- D. Compressors shall be hermetic scroll type equipped with manual reset low pressure cutout, motor overload protection, crankcase heater, compressor time delay non-recycling relay. Compressors shall have a five year warranty.
- E. Where indicated on the drawings, dehumidification package shall be factory installed in the units and shall consist of a hot gas reheat refrigerant coil located on the leaving side of the evaporator coil, low pressure switch to prevent evaporator coil, freeze-up, and a thermal expansion valve to insure a positive superheat condition. During dehumidification cycle supply air temperature shall at no time be warmer that space temperature. The unit shall have sufficient reheat capacity to produce neutral air in the dehumidification cycle. The dehumidification package shall be controlled by a wall mounted humidity sensor furnished under DDC Section.

- F. Gas heat exchangers shall be stainless steel. Controls shall include high limit, intermittent spark ignition, pilot flame sensor, main gas valve and redundant gas valve to achieve 100% pilot shut-off. Heat exchangers shall have a 15 year warranty.
- G. Unit casing shall be constructed of galvanized steel, bonderized or phosphatized, coated with a baked enamel finish and lined with 1" internal insulation. Casing shall be equipped with a base rail and corrosion resistant metal fan guards.
- H. Units 3 tons and larger shall have hinged access doors to all components that require servicing. Filter access doors shall require no tools to change filters.
- I. Casing shall have corrosion resistant metal coil guards.
- J. Casing shall mount on a full high roof curb and shall have down-shot duct connections inside the roof curb. Curbs shall be 16" high or a minimum of 8" above the finished roof surface. The roof curb shall be sloped to provide a level platform for the unit when installed on a sloped roof. See Architectural drawings for the amount and direction of the slope. Provide vibration isolation curbs where scheduled.
- K. Condensate drain pans shall be constructed of corrosion resistant material and sloped to conform to ASHRAE 62-89.
- L. Filters shall be 2" throw-away type.
- M. Units shall have an economizer cycle consisting of outside air, return air, and relief air dampers, a 24 volt spring return damper motor, adjustable mixed air controller, adjustable compressor cutout thermostat and enthalpy control to energize the economizer cycle. Economizer shall come with interface to allow DDC system control of the damper for demand controlled ventilation. The outside air damper shall remain closed when the unit runs in the unoccupied or night mode. Units shall have factory installed economizers. Where units with horizontal duct connections cannot have factory installed economizers, units shall have Micro-Metal field installed economizers or approved equal furnished with the unit.
- N. Units shall have a built-in phase loss protection relay.
- O. Units shall be pre-wired to a single point connection.
- P. Gas burners shall be operated with all heat on for a minimum of 20 minutes during start-up. If building has been turned over to the owner when this occurs it must be scheduled at a time acceptable to the owner.
- Q. Units shall be of the size, capacity and arrangement indicated on the drawings, and as manufactured by Carrier or approved equal by Lennox or Trane.

- R. Where units other than the basis of design are submitted, the Contractor shall also submit a sheet metal shop drawing showing the duct changes required to install the substitute unit.

2.2 WATER SOURCE HEAT PUMP UNITS

- A. Water source heat pump units shall be factory-built package water to air reverse cycle units complete with compressor, coil, heat exchanger, supply fan, reversing valve and filter designed for horizontal installation above a ceiling or vertical installation as shown on the drawings.
- B. The units shall be rated in accordance with ARI/ISO standard 13256-1 and shall be UL listed. The units shall be a high efficiency type with an EER equal to or greater than 13.1. The units shall be capable of operating with an entering water temperature of 40°F and entering air temperature of 40°F at ARI water and air flow rates.
- C. The unit casing shall be constructed of galvanized steel. The cabinet shall be compartmentalized with the compressor, reversing valve and water coil out of the air stream. All interior surfaces shall be lined with fiber glass insulation. Service access shall be through insulated access panels on the bottom or sides of the unit which shall provide access to all components. The unit shall have hanger brackets with vibration isolation which prevent the hanger rod from extending below the unit frame.
- D. Fans shall be DWDI forward curved, operating at 1200 rpm or less. Motors shall be multi-speed permanent split capacitor type with internal thermal overload protection. Fan scroll shall have one side removable for service. The fan wheel and motor shall be removable as an assembly without removing the fan scroll.
- E. Condensate drain pan shall be constructed of stainless steel and shall be insulated.
- F. Air coil shall be copper tube with corrugated aluminum fins.
- G. Water refrigerant heat exchanger shall be a tube in tube type with a working pressure of 625 psi. The outer wall shall be copper or steel and the inner wall shall be copper.
- H. Internal refrigerant piping shall be seamless copper tubing with all connections brazed. Schrader fittings shall be provided in liquid and suction lines.
- I. Reversing valve shall be a hermetic type with solenoid coil.
- J. Compressor shall be 1750 rpm scroll type with internal and external vibration isolator mounting and built-in motor overload protection. The compressor shall be bolted to the unit frame. Compressors shall have a five year warranty.
- K. Filters shall be 1" throwaway type installed in a field fabricated return air plenum. The unit shall be provided with a return air duct flange.

- L. Each unit shall be provided with limit controls to prevent operation when an unsafe condition exists. A refrigerant high pressure cutout shall deenergize the compressor if refrigerant pressure exceeds 600 psig. A low temperature thermostat with the sensing element directly in contact with the water or low pressure switch shall de-energize the compressor if the condenser water leaving the unit falls below 40°F.
- M. Units shall be capable of reset from the low voltage control circuit. Units shall not require that power supply be interrupted to reset.
- N. An overflow sensor in each unit shall prevent condensate overflow by stopping the compressor if condensate rises too high in the pan.
- O. The unit manufacturer shall furnish, factory install and wire a H.I. Solutions subbase board in accordance with the attached wiring diagram HP-1 and drawings of UUC-8HP base board. Factory wiring shall include 24vac power (minimum 75va), fan, compressor, reversing valve, overcurrent protection sensor, condensate sensor, high pressure sensor, low pressure sensor and low temperature sensor. The fan, compressor and reversing valve are controlled by switching 24vac. The protection sensors are all normally closed contacts. The CPOK interlock relay, UUC8E controller board, optional smoke detector, humidity sensor, supply air sensor, LAN communication and thermostat are field furnished and installed by the controls contractor and are not included in this proposal. For factory and/or field testing, a manual test board is available from H.I. Solutions. This test board connects to the subbase board in the space provided for the UUC8 controller board and provides LED indications for each protection sensor and manual switches for controlling the fan, compressor and reversing valve.
- P. All controls shall be installed in a control panel which shall be flush mounted and parallel with the side access panel of the unit.
- Q. Provide a 24 volt output terminal to cycle a water control valve with the compressor operation. The valve shall be field installed in the external piping.
- R. The units shall have a full parts warranty of one year and an extended compressor warranty for an additional four years. Warranty shall begin on the date of Substantial completion of the project where the units are installed.
- S. Units shall be installed above the ceiling in such a way that the amount of ceiling that must be removed for access shall be kept to an absolute minimum. Maintain a minimum of 24 inches clearance in front of access panels on all sides to service controls, compressors, and blower motors. Particular attention shall be given to location of condenser water mains and condensate drains in corridors.

- T. The Contractor shall completely install two units including electrical connection and the installation shall be inspected and approved by both the Engineer and a representative of the Gwinnett County Public Schools before proceeding with the installation of the remaining units.
- U. Water source heat pump units shall be of the size, capacity and arrangement indicated on the drawings and as manufactured by Climate Master.
- V. Contractor shall purchase the units from James Pleasants Company, the local Climate Master representative at the prices listed in the schedule on the drawings. The prices listed exclude tax and include freight to the job-site. The contractor shall include labor for any warranty work required during the one-year full warranty period.

2.3 ENERGY RECOVERY UNITS

- A. Energy recovery units shall be roof mounted units consisting of a weather-proof housing mounted on a full 16" high roof curb and containing supply and exhaust blowers, enthalpy wheel heat exchanger, cooling coil, compressor, hot gas reheat, filters and controls. The unit shall be completely factory assembled, pre-wired and thoroughly leak and safety control tested. After assembly, each unit shall be charged and run tested.
- B. Units shall be U.L. or E.T.L. listed. Performance shall be rated in accordance with ARI 340 and shall be ARI certified. Efficiency shall exceed ASHRAE 90.1.
- C. The housing shall be double wall construction of either steel or aluminum. Steel shall have G-90 galvanized coating. The outer housing shall be 20 gauge. Bases shall be 16 gauge. Inner liner shall be 22 gauge.
- D. Cabinet insulation shall be 2" thick closed cell foam insulation.
- E. The housing shall have access doors for access to fan motors and filters. Access doors shall be double wall construction and shall have stainless-steel hinges and quarter turn cam operated latches. Doors shall have full perimeter gasketing and rain break overhangs. Filter access doors shall require no tools to change filters.
- F. The housing shall have access doors for access to fan motors and filters. Access doors shall be double wall construction and shall have full-length stainless-steel piano hinges and quarter turn cam operated latches. Doors shall have full perimeter gasketing and rain break overhangs. Filter access doors shall require no tools to change filters.
- G. The design of the cabinet shall allow access to the compressor and electrical control panel without impairing unit operation.
- H. Unit base pan shall be constructed of G90 galvanized steel or aluminum with welded joints and seams and with water dams around all openings.

- I. All exterior screws, nuts, bolts and washers shall be zinc or cadmium coated and shall withstand a minimum of 1,000 hours Salt Spray Test per ASTM B117 97.
- J. Housing shall be coated with 0.3 MIL polyurethane or alkyd primer, then finished with 0.8 MIL polyester or acrylic urethane topcoat. Final color shall be selected by the Architect. Finish shall meet or exceed 1,000-hour Salt Spray Test per ASTM B117 97.
- K. Fresh air inlet and exhaust outlet shall have rain hoods and bird screens outside and motor operated dampers inside the unit which shall open when the fans start. Supply and exhaust duct connections shall be inside the roof curb. The roof curb shall not be used as a plenum. Exhaust damper may be barometric.
- L. In addition to the outside air damper and exhaust damper, the unit shall be provided with integral return air motorized damper to allow the unit to provide space humidity override during the unoccupied mode. Dampers will be low leak, airfoil design with extruded vinyl blade edge and jamb seals. The dampers will be rated for a maximum leakage rate of less than one percent of nominal airflow at 1 inch water gauge. Blades will rotate on bronze sleeve bearings. The actuators shall be direct drive.
- M. Roof curbs shall be full perimeter type constructed of 18 gauge galvanized steel, shall be internally insulated with 1.5" thick rigid fiberglass and shall have a wood nailer. Curbs shall be 16" high or a minimum of 8" above the finished roof surface. The roof curb shall be sloped to provide a level platform for the unit when installed on a sloped roof. See Architectural drawings for the amount and direction of the slope. The unit housing shall be designed to hang over the roof curb to provide an integral curb counter flashing and for positive positioning of the unit on the curb. Provide vibration isolation curbs where scheduled.
- N. Supply and exhaust blowers shall be backward inclined airfoil type or forward curved centrifugal type with variable speed drives for balancing the air flow. The complete blower and motor assembly shall be mounted on vibration isolators or shall have full curb isolation. The blower wheel shall be mounted on a solid steel shaft supported by ball bearings. Motors shall not be loaded to greater than 80% of their rated horsepower. Blowers shall be AMCA certified and shall bear the AMCA seal.

- O. Enthalpy wheel rotor shall be constructed of either aluminum coated with corrosion inhibitor, corrugated synthetic fiber, or spirally bound polystyrene. Manufacturer's ratings shall be certified by ARI as complying with Standard 1060-2000 and shall bear the ARI certification symbol. Wheel shall be mounted in a rigid frame containing the wheel drive motor, drive belt, wheel seals, and bearings. The energy recovery wheel media shall be capable of removal from the cassette and replacement without the use of tools. Wheel media shall be cleanable using hot water or light detergent without degrading the efficiency. A motion sensor on the enthalpy wheel shall shut down the unit if the wheel fails to turn.
- P. Refrigerant cooling coils, condenser coils and hot gas reheat coils shall be aluminum fin, mechanically bonded to seamless copper tubing. Coils on units with two refrigerant circuits shall be face split or intertwined type.
- Q. Compressors shall be hermetic scroll type with crankcase heater. Units with compressor capacity larger than five tons shall have two compressors and two refrigerant circuits. Lead compressor shall be a variable capacity scroll capable of modulation from 10-100% of its capacity. Refrigerant circuit shall include accumulator, filter-dryer, sight-glass, dual gauge connections and thermal expansion valve. Safety controls shall include high pressure switch, low pressure switch and non-recycle timer. Head pressure shall be controlled by a variable frequency drive on the condenser fan. Compressors shall have a five year warranty.
- R. Hot gas reheat coil shall be controlled by an electronically controlled step motor type valve positioned by the control system to maintain a constant leaving air temperature. On two compressor units the reheat coil shall be connected to the lead compressor only when the lead compressor can provide sufficient reheat.
- S. Gas heating section shall have four stages of control, induced draft blower, pressure switch and electronic ignition. Heat exchanger shall be stainless steel. Heat exchanger shall have 15 year warranty.
- T. Condensate pan shall be constructed of stainless steel and shall be sloped to drain as required by ASHRAE 62-1989.
- U. Filter racks shall be provided in both supply and exhaust air streams ahead of the coils and enthalpy wheel. Filters shall be 2" thick pleated type with an efficiency of 30%. Filters shall be sized for a maximum of 500 fpm face velocity.
- V. The energy recovery units shall be completely factory assembled and pre-wired with a single point electrical power connection. A main disconnect switch and motor starters with 3 overloads shall be factory mounted and wired in a weather-proof control panel. Each circuit shall be separately fused.

- W. Controls shall be factory installed and prewired. Temperature and humidity sensors, CO2 sensor, fan static differential pressure switches and control module shall be furnished by building control system manufacturer. All other controls including door interlock switches, damper actuators, motor starters and refrigeration controls shall be furnished by the unit manufacturer. A terminal strip shall be provided for connection of the EMS LAN and duct mounted smoke detectors.
- X. A wiring diagram for the EMS controls shall be furnished to the unit manufacturer by the building control system manufacturer. See DDC specification Section.
- Y. Energy recovery units shall be controlled as follows:
1. An H.I. Solutions control module shall be factory install and wired in each unit.
 2. Each ERU unit and shall be programmed to start and stop according to the occupied/unoccupied schedule provided by the Owner. The units shall not run when the building is unoccupied.
 3. Supply and exhaust fans and the enthalpy wheel in the ERU shall run continuously when the ERU unit is running.
 4. A temperature sensor and humidity sensor located in the exhaust air intake shall provide temperature and humidity input signals to the control module.
 5. A CO2 sensor located in the exhaust air intake shall provide an indication of the average CO2 level in the space.
 6. When the temperature of the exhaust air is above 75°F or the relative humidity of the exhaust air is above 50% the unit compressor shall run in the cooling cycle. On units with multiple compressors or variable speed compressors when the relative humidity rises above 50% all compressors shall run at full speed to produce maximum cooling and dehumidification capacity.
 7. A temperature sensor located in the supply air shall control the hot gas reheat coil to maintain a minimum leaving air temperature of 70°F when the compressor is running.
 8. The temperature sensor in the supply air shall also control the gas heat to maintain a minimum leaving air temperature of 60°F when the unit is not in the cooling cycle.
 9. A temperature sensor and a humidity sensor in the outside air stream on the leaving side of the enthalpy wheel shall provide temperature and humidity indication only.
 10. A temperature sensor in the outside air stream on the leaving air side of the cooling coil shall provide temperature indication only.

11. A temperature sensor and a humidity sensor located in the outside air supply duct shall provide temperature and humidity indication only.
 12. Duct mounted smoke detectors installed in the supply air duct of the ERU shall shut down the unit when smoke is present.
 13. When the unit is in the unoccupied mode, the outside air damper and exhaust air damper shall close and the return air damper shall open. Upon a signal from a wall mounted humidity sensor located as shown on the floor plans, that the space humidity exceeds set point, the unit shall energize the supply fan, dx cooling, and modulate the reheat coils as necessary to maintain the relative humidity set point.
 14. If a manufacturer cannot provide any of the above control features such as temperature or humidity indication the manufacturer shall arrange for the automatic temperature control supplier to provide the function at no additional cost to the owner.
- Z. The unit manufacturer shall provide factory start-up. The start-up report shall be included in the close-out documents. A copy of the start-up report shall be sent to the engineer as soon as the start-up is completed.
- AA. Energy recovery units shall be of the size and capacity scheduled on the drawings and shall be as manufactured by Aaon or approved equal by Addison or Greenheck.

2.4 COOLING TOWER

- A. Cooling tower shall be a factory assembled induced draft propeller fan design with vertical air discharge.
- B. Cold water basin shall be constructed of Type 304 stainless steel with depressed center section with bottom outlet, bottom drain and clean-out connection. Basin shall have hinged access doors in tower end walls, lift out steel strainers, anti-vortexing hood and electric conductance actuated water level control package with slow closing solenoid valve and high and low water level alarm contacts. Water level control shall mount inside the tower for freeze protection.
- C. Air inlet louvers shall be wave form PVC or fiberglass reinforced polyester mounted in a steel frame. Hot water distribution basins shall be spray header and branches constructed of schedule 40 PVC with ABS spray nozzles or open gravity type with distribution weirs and metering orifices. Wet deck surface and drift eliminators shall be formed from polyvinyl chloride.

- D. Fan shall high efficiency axial propeller type with non-corrosive FRP hub and blade construction designed for low sound level. Fan shall be statically balanced and installed in a closely fitted cowl with venturi air inlet for maximum fan efficiency. Fans shall be supported by ball bearings designed for minimum L10 life of 40,000 hours. Fan shall be driven by one piece multi-groove neoprene and polyester belt.
- E. Fan motor shall be totally enclosed fan cooled (TEFC) or totally enclosed air-over (TEAO) 1800 RPM motor with special moisture protection for cooling tower service when installed in tower discharge air stream. Motors shall have shaft grounding rings.
- F. Inverter ready fan motors are required for applications using Variable Frequency Drives for fan motor control. Where variable speed fan drives are specified the tower manufacturer shall state in the submittals any harmonic fan speed which must be avoided by the VFD.
- G. Access doors shall be provided on both end walls. A steel wire fan guard shall be provided over the fan.
- H. All steel components except basin shall be G235 hot dip galvanized steel.
- I. Electric cold water basin heaters shall be provided as indicated on the drawings. Heaters shall be provided with pre-wired NEMA 4X control panel containing thermostat, low water switch, and contactor for single point electric connection. All heater, thermostat bulb well and low water switch fittings in the cold water basin shall be factory installed.
- J. The cooling tower shall be of the size and capacity scheduled on the drawings. Scheduled fan motor horsepower is the maximum allowed. Performance shall be certified by the Cooling Tower Institute in accordance with CTI STD-201.
- K. The cooling tower shall be equipped with a working platform with ladder and Davit. The working platform and Davit shall be constructed of aluminum. The ladder and platform shall comply with OSHA requirements. The ladder shall extend down to three feet below the base of the tower.
- L. The cooling tower shall be as manufactured by Evapco or approved equal by Baltimore Aircoil or Marley.

2.5 HEAT EXCHANGER

- A. Heat exchanger shall be plate and frame type.
- B. Frame shall be constructed of carbon steel with stainless steel upper carrying bar and lower guide bar. All frame parts finished with epoxy enamel paint.

- C. Plates shall be fabricated from type 304 stainless steel, with one piece clip-on molded nitrile rubber gaskets.
- D. Plate and frame heat exchanger shall bear ASME stamp and certification for a design pressure of 150 PSIG. Heat transfer capacity shall be ARI certified.
- E. Provide aluminum shroud around plate pack.
- F. Plate and frame heat exchanger shall be manufactured by Sondex or approved equal by Alfa Laval, APV, Armstrong, Bell & Gossett, GEA, Mueller, Polaris, or Vicarb.

2.6 ELECTRIC HOT WATER BOILER

- A. Electric hot water boiler shall be factory assembled and pre-tested prior to shipment. Boiler shall be U.L. labeled and shall have an ASME, Type "H" stamp.
- B. The pressure vessel shall be housed in a 16 gauge steel enclosure with a baked enamel finish and 4" of one pound density fiberglass insulation. The electric panel and vessel shall be mounted on a common structural steel base.
- C. The power circuit shall include current limiting fuses and magnetic contactors. Contactors shall be rated for 100,000 cycles at full load. Provide a lockable main power disconnect switch in the control panel. The boiler shall be factory wired with a single point of connection in the disconnect switch.
- D. Heating elements shall be Incoloy with watt density of 75 watts per square inch.
- E. Controls shall include a 120 volt control transformer with fuses in primary and secondary, on/off switch, pilot lights for each stage, manual reset probe type low water cut-off, two high limit cutouts, one auto reset and one manual reset and three stage on-off control. Temperature control will be provided by the building energy management system.
- F. The boiler shall be fitted with flanged inlet and outlets, combination temperature and pressure gauges, full port drain valve and be equipped with an ASME relief valve set @ 60 PSIG.
- G. Boilers with a heat input greater than 200,000 BTU per hour shall comply with the Georgia Boiler and Pressure Vessel Safety Act of 1985. The boiler must be ASME Code stamped and registered with The National Board of Boiler and Pressure Vessel Inspectors.
- H. Start up service shall be provided by factory trained personnel and a start up report shall be supplied to the engineer indicating findings.
- I. The boiler shall be of the size and capacity indicated on the drawings and as manufactured by Lochinvar or approved equal by Indeco, Lattner Boiler Manufacturing Co. or Precision.

2.6 PUMPS

- A. Pumps shall be of the centrifugal type with cast iron casing, bronze impeller, corrosion resistance steel shaft, mechanical seal and accessory drip pan. Pump efficiency shall be as scheduled on the drawings.
- B. Motors shall be premium efficiency, inverter ready, drip-proof type equipped with grounding rings and of adequate size to prevent overloading. Fractional horsepower motors shall have built-in thermal overload protection.
- C. Pumps shall be flexibly coupled frame or base mounted with drop-out center coupling such that seal may be serviced without moving the motor.
- D. Flexibly coupled pump shall be laser aligned after installation of all piping but before start-up. A report on the alignment shall be provided to the owner and engineer.
- E. Pumps shall have threaded taps for pressure gauges as shown on the drawings.
- F. Base mounted and close coupled pumps shall be of the size and capacity indicated on the drawings and as manufactured by Armstrong, Aurora, Bell & Gossett, Grundfos, Paco, Patterson, Peerless, Taco or Weinman.

2.7 PUMP ACCESSORIES

- A. Suction diffusers with built-in strainers, inlet vanes and support leg shall be furnished for pumps as scheduled or indicated on the drawings. Two strainers shall be provided at each pump, a fine mesh start-up and a normal operation strainer with 1/8" diameter holes.
- B. Triple duty combination check valves calibrated balancing valves with gauge connections and tight shut off valves shall be furnished for pumps as scheduled or indicated on the drawings.
- C. Pumps accessories shall have threaded taps for pressure gauges as shown on the drawings.
- D. Pumps accessories shall be of the size and type indicated on the drawings and as manufactured by Armstrong, Bell & Gossett, Mueller, Taco or Wheatly.
- E. Where mechanical joint pipe couplings and fittings are used, triple duty valves and suction diffusers and as manufactured by Anvil Gruvlok, Grinnell or Victaulic are acceptable.

2.8 DUCTLESS SPLIT SYSTEM AIR CONDITIONING UNITS

- A. Ductless split system air conditioning units shall be a combination of an air-cooled heat pump unit or condensing unit as scheduled on the drawings and a direct expansion fan-coil unit. The outdoor section shall be a factory assembled unit with direct drive fans, horizontal air discharge, variable speed, scroll compressor, refrigerant coil, fan motor, prewired control panel and holding charge of R410A refrigerant. The indoor fan coil unit shall include refrigerant coil, fan and motor, condensate pan with drain and prewired control panel. The indoor fan coil unit shall be wall mounted with a horizontal discharge or flush mounted in a T-bar ceiling with adjustable discharge louvers as indicated on the drawings.
- B. Refrigerant coils shall be of non-ferrous construction with mechanically bonded, smooth plate fins. All tube joints shall be brazed. Coils shall be pressure tested at the factory.
- C. Condenser fans shall be direct driven, propeller type fans arranged for horizontal discharge. Condenser fan motors shall have inherent protection, shall be permanently lubricated and resiliently mounted. Each fan and coil shall have a safety guard and wind baffle to allow operation to 0°F outside.
- D. Evaporator fan section shall have forward-curved blade, double inlet fans mounted on a solid shaft and run on permanently lubricated bearings. Fans shall be statically and dynamically balanced.
- E. Cabinets shall be made of galvanized steel, bonderized and finished with baked enamel. Compressor shall be serviceable hermetic type mounted to avoid vibration and equipped with high and low pressure switches and external service valves.
- F. The system shall be controlled by a microprocessor with diagnostic capability, located in the indoor unit. A wall-mounted, permanently wired remote control equipped with operation indicator lamps shall provide temperature control, airflow selection rate, heating/cooling mode selection, on/off switch.
- G. An external condensate pump with integral sump shall be provided where indicated on the drawings.
- H. Return air shall be filtered using removable, washable filters.
- I. Provide aluminum wrapped or rigid covers on refrigerant line sets in all areas not concealed in walls or chases.
- J. Ductless split system air units shall be of the size and capacity indicated on the drawings and as manufactured by Carrier, Daikin or Mitsubishi.

2.9 CONDENSATE PUMPS

- A. Condensate pumps shall be constructed of ABS plastic and shall have a one gallon reservoir, float switch, motor with built-in thermal overload protection, cord and plug. The pump shall be UL listed and shall be suitable for use with condensing furnaces.
- B. Provide a check valve in the pump discharge.
- C. Condensate pumps shall be of the size and capacity indicated on the drawings and as manufactured by Little Giant or approved equal by Crane, Hartell, Sarco, or Weil.

2.10 ELECTRIC UNIT HEATERS

- A. Electric surface or recessed ceiling mounted unit heaters shall be 20 gauge steel with 24" x 24" louvered supply/return ceiling grille. Finish shall be off-white. The heater shall have a propeller type fan, sheathed fin tube heating elements and automatic reset high limits. Control panel shall contain a contactor and a fused 24 volt transformer/relay and/or integral thermostat as scheduled. Provide a power disconnect switch. Heater shall be designed for surface mounting or recessed mounting in a 2 x 2 tee-bar ceiling as indicated on the drawings. Provide accessory plaster ring for recessed mounting in gypsum board ceiling with external handle.
- B. Electric heaters shall be U.L. or ETL labeled. All accessories shall be factory mounted. Heaters shall be of the size, capacity, and arrangement as indicated on the drawings and shall be as manufactured by Q-Mark or approved equal by Berko, Markel or Raywall.

2.11 EXHAUST FANS - CEILING MOUNTED & IN-LINE

- A. Ceiling mounted and in-line exhaust fans shall have centrifugal fan, shaded pole fan motor with built-in thermal overload protection, steel cabinet with fiberglass acoustical lining, backdraft damper and ceiling grille. Support fan from building structure using four 1/4" diameter threaded rods.
- B. Ceiling mounted and in-line exhaust fans shall be AMCA rated.
- C. Provide wall discharge caps, brick vents, sloped roof caps or curb mounted roof caps as indicated on the drawings.
- D. Ceiling mounted and in-line exhaust fan shall be of the size, capacity and arrangement indicated on the drawings and as manufactured by PennBarry or approved equal by Acme, Breidert, Broan, Carnes, Cook, Greenheck, Jenn-Air or Twin City Fans.
- E. Prefabricated roof curbs as specified herein shall be provided for each roof cap as indicated on the drawings.

2.12 EXHAUST FANS - POWER ROOF VENTILATORS - DIRECT DRIVE

- A. Power roof ventilators shall have spun aluminum housings, centrifugal fan wheel, direct drive motor with built-in thermal overload protection, pre-wired toggle type disconnect switch, bird screen, backdraft damper and prefabricated roof curb.
- B. Exhaust fans shall be AMCA rated for both air and sound.
- C. Exhaust fans shall be of the size, arrangement and capacity indicated on the drawings and as manufactured by Acme, Cook, Greenheck, Jenn-Air, or PennBarry.
- D. Prefabricated roof curbs as specified herein shall be provided for each roof mounted fan

2.13 EXHAUST FANS UPBLAST POWER ROOF VENTILATORS

- A. Upblast power roof ventilators shall have spun aluminum housings with Aluma Glas corrosion resistant coating, centrifugal fan wheel with epoxy coating, direct drive motor with built in thermal overload protection, pre-wired toggle type disconnect switch, bird screen, epoxy coated backdraft damper and prefabricated roof curb.
- B. Exhaust fans shall be AMCA rated for both air and sound.
- C. Upblast exhaust fans shall be of the size, arrangement and capacity indicated on the drawings and as manufactured by PennBarry, Acme, Cook, Greenheck or Jenn Air.

Prefabricated roof curbs as specified herein shall be provided for each roof mounted fan.

2.14 AIR DISTRIBUTION DEVICES

- A. Air distribution devices shall be of the size and type scheduled on the drawings and shall be as manufactured by Krueger or approved equal by Anemostat, Carnes, E. H. Price, Metal Aire, Nailor, Titus or Tuttle & Bailey.

2.15 VOLUME DAMPERS

- A. Volume dampers shall be constructed with not less than 18 gauge galvanized steel blades or 0.080" thick extruded aluminum blades, galvanized, structural steel channel frame, permanently lubricated bearings, steel shafts and linkage. Dampers shall be linked for opposed blade operation. Manual volume dampers shall have locking quadrant operators. Motor operated volume dampers shall have extended shafts to connect operator.

2.16 FIRE DAMPERS

- A. Horizontal or vertical fire dampers with 165°F fusible link shall be installed where indicated on the drawings. Fire dampers shall be tested by Underwriters' Laboratories, Inc. in compliance with U.L. 555 and shall have a U.L. label.

- B. Fire dampers shall be installed in a galvanized steel sleeve with mounting angles, constructed of the same gauge metal as the duct to which it is to be attached or 16 gauge as required by the manufacturer's installation instructions. Installation shall be in accordance with U.L. 555 requirements and the manufacturers installation instructions.
- C. Damper shall have an access door or panel for inspection and service.
- D. Fire dampers shall be 1-1/2 hour or 3 hour rated as indicated on the drawings. Dampers in rectangular ducts, twelve inches or more in height shall be constructed with blades located in the air stream. Dampers in rectangular ducts less than twelve inches in height shall be constructed with blades recessed out of the air stream. Dampers in round ducts shall be constructed with a rectangular housing containing blades out of the air stream and with round duct connection flanges.

2.17 SMOKE DAMPERS

- A. Smoke dampers shall be installed at the locations indicated on the drawings. Smoke dampers shall be classified by Underwriter's Laboratories, Inc. in compliance with U.L. 555S and shall have a U. L. label. Smoke dampers shall have a maximum leakage rate of 4 CFM per square foot at 1" W. G. pressure (Class I. and a temperature rating of 250°F).
- B. Smoke dampers shall have an electric operator factory installed. The damper shall be normally closed and shall open when the operator is energized. Voltage shall be 24 volts.
- C. Damper shall have an access door or panel for inspection and service.

2.18 COMBINATION FIRE & SMOKE DAMPERS

- A. Combination fire & smoke dampers shall be installed at the locations indicated on the drawings. Combination dampers shall be classified by Underwriter's Laboratories, Inc. in compliance with U.L. 555S and shall have a U. L. label. Combination fire & smoke dampers shall have a maximum leakage rate of 4 CFM per square foot at 1" W. G. pressure (Class I. and a temperature rating of 250°F)
- B. Combination fire & smoke dampers shall be installed in a galvanized steel sleeve with mounting angles, constructed of the same gauge metal as the duct to which it is to be attached or 16 gauge as required by the manufacturer's installation instructions. Installation shall be in accordance with U.L. 555S requirements and the manufacturers installation instructions.
- C. Combination fire & smoke dampers shall have an electric operator factory installed. The damper shall be normally closed and shall open when the operator is energized. Voltage shall be 24 volts.

- D. Combination fire & smoke dampers shall be 1-1/2 hour or 3 hour rated as indicated on the drawings.
- E. Damper shall have an access door or panel for inspection and service.

2.19 BACKDRAFT DAMPERS

- A. Backdraft dampers shall be constructed of a galvanized steel frame with non-combustible neoprene coated fiberglass blades and a galvanized expanded metal rear grille.
- B. Backdraft dampers shall withstand a maximum back pressure of 4"w.g.
- C. Backdraft dampers shall be Ruskin Model NMS2 or approved equal by Air Balance Inc., Arrow, Louvers and Dampers Inc., Safe Air, Venco or Vent Products.

2.20 PRE-FABRICATED ROOF CURBS

- A. Pre fabricated roof curbs shall be of box section design, 18 gauge galvanized steel with continuous welded and full mitered corner seams, treated wood nailer, insulated with 1 1/2" thick 3 pound density rigid fiberglass board insulation. Curbs shall be 16" high or a minimum of 8" above the finished roof surface with straight sides. Cants shall be provided under Roofing Section. See Architectural Drawings for details. Curbs for roof hoods shall follow roof slope. Curbs for exhaust fans shall be shimmed to provide level platform.
- B. Curbs shall be as manufactured by AES, Creative Metals, Curbs Plus, L&D, MGM, Pate, RPS or Shipman. Curbs shall be furnished for each piece of roof mounted equipment except roof-top air conditioning units and shall be of the proper size to fit the equipment furnished. Curbs for roof-top air conditioning units shall be furnished by the unit manufacturer.

2.21 PRE-FABRICATED EQUIPMENT SUPPORT CURBS

- A. Pre-fabricated equipment support curbs shall be Pate model ES-2. Supports shall be 18 gauge galvanized steel, monolithic construction with integral base plate, continuous welded and full mitered corner seams, treated wood nailer, 18 gauge galvanized steel counter flashing. Support shall be 16" high or a minimum of 8" above finished roof surface
- B. Equipment support curbs shall be as manufactured by Pate or approved equal by Curbs Plus or RPS. Supports shall be of the proper size to fit the components being installed.

2.22 PRE-FABRICATED PIPE CURB ASSEMBLY

- A. Pre-fabricated pipe curb assemblies shall be Series AWI vaults as manufactured by Roof Penetration Housings LLC. The vaults shall consist of a removable vandal resistant lid, middle housing, insulation extension and wide flanged curb. They shall be constructed of powder coated aluminum with gaskets and stainless-steel hardware. Aluminum or stainless-steel exit seals with gaskets shall be used where each pipe or conduit exits the housing.
- B. Provide appropriately sized vault /curb for utilities being installed.
- C. Pipe curbs shall be as manufactured by Roof Penetration Housing LLC or approved equal by ALTA. Pipe Curbs shall be provided at the locations indicated on the drawings and shall have openings for gas or refrigerant pipes, power conduit and control conduit.

2.23 LOW PRESSURE DUCTWORK

- A. All ductwork except that indicated to be of other types of construction shall be low pressure galvanized steel ductwork.
- B. Low pressure galvanized steel ductwork shall be installed as diagrammatically shown on the drawings and shall be constructed in accordance with the SMACNA HVAC Duct Construction Standards, 1995 Edition.
- C. Low pressure galvanized steel ductwork shall be constructed of galvanized sheet steel of lock forming quality and with a galvanized coating not less than 1 1/4 ounces per square foot total for both sides. Low pressure ductwork shall be 1" W. C. pressure class.
- D. Radius elbows shall be full radius type with a throat radius equal to the duct width as shown in Fig 2.2, Type RE1. Square elbows shall have double thickness turning vanes as shown in Fig. 2 3.
- E. Transitions shall be made with a slope not exceeding 1 in 4 where space permits.
- F. Transverse joints shall be sealed in accordance with Table 1.2, Duct Sealing Requirements, Class C for 2" operating pressure. Sealants shall U.L. listed mastic or liquid.
- G. Transverse joints in ductwork installed outside shall consist of roll formed flanges, corner pieces, gasket and cleat. The flanges shall have an integral mastic to seal the flange to the duct.
- H. Round duct shall be connected to rectangular duct using spin in fittings with scoop and damper or scoop only with no damper as indicated on the drawings. Provide quadrant standoff brackets on dampers in insulated duct.

- I. Install duct mounted smoke detectors in the ductwork at the locations shown on the drawings.
- J. Access doors shall be installed in the ductwork at each fire damper and volume damper and elsewhere as indicated on the drawings. Access doors shall be internally insulated double wall type.

2.24 CHEMICAL FUME HOOD DUCT

- A. Chemical fume hood duct, connectors and transitions to fans or equipment shall be type 316 stainless steel.
- B. Chemical fume hood flexible duct shall be stainless steel flexible duct constructed of 0.005" thick type 316 stainless steel conforming to ASTM A240.

2.25 FLEXIBLE DUCT

- A. Low and medium pressure flexible duct shall be constructed of a three-ply inner liner of aluminum, fiberglass and polyester, or a single ply CPE liner bonded to a galvanized steel wire helix and insulated with fiberglass insulation with fire retardant fiber reinforced metalized vapor barrier.
- B. Flexible duct shall be U.L. listed as a class 1 air duct complying with U.L. standard 181 and shall have a working pressure of 10" minimum. Fiberglass insulation shall have an R of 6.0. The duct shall be tested for a maximum internal operating temperature of 250°F.
- C. Flexible duct shall be connected to rectangular duct using spin in fittings with scoop and damper or scoop only with no damper as indicated on the drawings.
- D. To install, peel back insulation and outer jacket approximately 4" to expose duct. Slide duct over collar and apply clamp. Clamps shall be self locking nylon type. Pull insulation back into position. Tape over end of jacket with 3 wraps to seal.
- E. Flexible duct shall be as manufactured by Flexmaster Type 3, Thermaflex M-KE or Atco UPC 39.
- F. Where flexible duct is connected to ceiling diffusers, the duct shall be installed with a radius equal or greater than the diameter of the duct. When conditions cause the elbow radii to be less than duct diameter, the contractor shall install a Titus FlexRight flexible duct support as detailed on the drawing. Approved equal devices by Hart & Cooley or Thermaflex are acceptable.

2.26 REFRIGERANT PIPING AND SPECIALTIES

- A. Refrigerant piping, except piping factory installed as part of equipment, shall be type "L" hard drawn copper tubing conforming to ASTM Specification B 88. Fittings shall be long radius type wrought copper solder fittings conforming to ASTM Specification B 75.
- B. Where recommended by the air conditioning unit manufacturer, refrigerant piping in VRF systems and low tonnage split systems may be type "L" soft annealed copper tubing conforming to ASTM Specifications B-88.
- C. Joints in refrigerant piping shall be made with silver solder or Silfos except that joints at valves may be made with 95 5 solder. ZoomLock or Sporlan/Parker press fittings are acceptable.
- D. Hangers shall be B-Line Fig. 3170 adjustable swivel ring hangers or approved equal by Grinnell, Michigan or PHD. Hangers shall be spaced at not greater than 6'0" intervals and shall be secured to the building structure with lag bolts.
- E. Vertical risers shall be supported with horizontal sections of B-Line, Unistrut or Michigan channel installed 4'0" on center. Clamps shall have rubber isolators.
- F. Pipe covering protection saddle shields shall be used in conjunction with all horizontal insulated lines. Shields shall be 16 gauge galvanized sheet metal.
- G. Each refrigerant circuit shall have a sight glass and filter dryer installed in the liquid line.

Refrigerant piping shall be installed in strict accordance with equipment manufacturer's recommendations. If any changes from the refrigerant piping details on the drawings are required by the manufacturer, a piping diagram of each refrigeration piping system shall be prepared and submitted for approval. The piping diagram shall be first approved by the equipment manufacturer before submittal is made to the Architect.
- H. The refrigerant piping system shall be pressure tested at 350 psig and checked for leaks with a leak detector. The system shall then be purged and evacuated to 250 microns. The vacuum shall be broken with dry nitrogen and then purged and evacuated to 100 microns. The system shall then be charged according to the unit manufacturer's recommendations.
- I. Refrigerants shall not be released into the atmosphere. If refrigerant must be removed from a system for any reason, a refrigerant recovery unit shall be used.
- J. Cover exposed refrigerant lines with aluminum lines set covers.

2.27 CONDENSATE DRAIN PIPING (COPPER)

- A. Condensate drain piping shall be type "L" hard drawn copper tubing conforming to ASTM Specification B 88. Fittings shall be long radius type wrought copper or bronze solder fittings conforming to ASTM Specification B 75.
- B. Drain piping shall be pitched not less than 1/8 inch per foot in the direction of the flow.
- C. Joints in copper pipe shall be made with 95 5 tin antimony solder.
- D. In lieu of soldered fittings in copper pipe the contractor may substitute Anvil Gruvlok, Grinnell or Victaulic or grooved mechanical couplings, Rigid Pro Press system or T-Drill mechanically formed fittings with brazed connections. Each of these systems shall be used in accordance with the manufacturer's published instructions.
- E. Hangers shall be B-Line Fig. 3170 adjustable swivel ring hangers or approved equal by Grinnell, Michigan or PHD. Hangers shall be spaced at not greater than 6'0" intervals and shall be secured to the building structure with beam clamps.
- F. Pipe covering protection saddle shields shall be used in conjunction with all horizontal insulated lines. Shields shall be 16 gauge galvanized sheet metal.
- G. Condensate drain piping installed on the roof shall be supported on Miro Industries 3-RAH-8 pillow block pipe stands and support pad installed at maximum of 10 feet on center. The pipe stands shall be constructed of polycarbonate resin plastic and shall have a nylon roller with a self lubricating Teflon base to support the pipe. . Approved equal by MAPA, Pate, RPS, EAS or Rooftop Blox.

2.28 WATER PIPING

- A. Circulating water, cooling tower water and hot water piping shall be schedule 10 black steel conforming to ASTM Specifications A-135.
- B. Piping 2" and smaller may in lieu of steel piping be type "L" hard drawn copper tubing conforming to ASTM specification B-88.
- C. Drain piping installed outside the building shall be schedule 40 galvanized steel piping conforming to ASTM A-53 with threaded joints and galvanized fittings.
- D. Water piping mains shall be installed dead level. The run outs shall be graded in a manner to prevent air traps being formed when the mains expand or contract. Air vents shall be installed at the ends of mains and at all high points in the systems.
- E. Copper pipe fittings shall be wrought copper solder fittings conforming to ASTM Specification B-75.

- F. Joints in copper piping shall be made with silver solder or Silfos except that joints at valves may be made with 95-5 solder.
- G. Steel pipe mechanical couplings and fittings shall be Victaulic, rigid style, installation-ready or AGS or approved equal fittings by Anvil Gruvlok, Grinnell or Shurjoint on schedule 10 black steel pipe 2-1/2" and larger and Victaulic QuickVic SD fittings using PC3110 Cut and Mark Tool on pipe 2" and smaller. Flexible couplings may be used for thermal expansion in lieu of flexible connectors. The mechanical couplings and fittings shall be installed in accordance with the manufacturer's published instructions. Victaulic Headers are acceptable.
- H. In lieu of soldered fittings in copper pipe the contractor may substitute installation-ready grooved end mechanical couplings and fittings by Anvil Gruvlok, Grinnell, Shurjoint or Victaulic, Rigid Pro Press system or T-Drill mec VALVES-
- I. The valves shall be suitable for the service for which they are installed and shall be fitted with the proper packing, lubricants, etc. All gate valves shall have back seats for repacking under pressure. Needle valves are not acceptable.
- J. Ball valves for steel lines (1/2" to 2") shall be Milwaukee BA100 bronze body, two-piece valve with threaded ends, rated at 600 psi WOG or approved equal by Apollo, Crane, Hammond, Kitz, Nibco, Stockham or Watts.
- K. Ball valves installed in insulated chilled water lines shall have stem extensions.
- L. Gate valves for steel lines (1/2" to 2") shall be Milwaukee 105 bronze valve with non rising stem, threaded ends, rated at 200 psi WOG or approved equal by Crane, Hammond, Kitz, Nibco, Stockham or Watts.
- M. Butterfly valves (2 1/2" and larger) shall be Milwaukee Series M ductile iron lug type valve with EPDM liner, eight threaded lugs so that valve can remain bolted to one flange while the other flange is removed and with lever lock handle operator with 10 degree notches and position lock, or approved equal by Centerline, Kitz, Mueller, Nibco or Watts.
- N. Hose end drain valves shall be bronze ball valve with hose end, Milwaukee BA100H or approved equal by Apollo, Crane, Hammond, Kitz, Nibco or Stockham.
- O. Where mechanical joint or pressfit pipe couplings and fittings are used in lieu of welded or screwed pipe joints, ball valves, gate valves, check valves and butterfly valves as manufactured by Anvil Gruvlok, Grinnell or Victaulic (OGS, AGS) are acceptable.

2.29 FLOW CONTROL AND BALANCING VALVES

- A. Flow control valves shall be installed at each water source heat pump unit, fan-coil unit and air handling unit as indicated on the drawings to maintain the scheduled GPM within 5% with differential pressure across the valve of 2 to 32 PSI. For 1/2" to 2" valves with stainless steel or brass flow cartridges, the flow cartridge shall be removable from the Y-body housing without the use of tools. Furnish a metal or plastic tag suspended on a chain or wire ring at each valve indicating the rated flow in GPM and the differential pressure.
- B. Units shall be connected to the condenser water piping using two 36" long rubber hoses with steel braid covers, flared metal ends and a union.
- C. Valve assemblies installed in insulated chilled water lines shall have extensions on ball valve handles and pressure and temperature ports.
- D. Valve assemblies in the return line shall be a combination assembly consisting of a ball valve, a flow control valve and pressure and temperature ports with a flexible hose as indicated on the drawings. The valve assembly shall be a Flow Design Inc. Autoflow type AC or approved equal by B&G, Hydronic Components Inc., Griswold, Nexus, Pro Hydronic or Victaulic.
- E. Valve assemblies in the supply line shall be a combination assembly consisting of a ball valve, a minimum 1" diameter strainer with a hose end drain valve with cap and chain and pressure and temperature ports with a flexible hose as indicated on the drawings. The valve assembly shall be a Flow Design Inc. type YC or approved equal by B&G, Griswold, Nexus, Pro Hydronic or Victaulic.
- F. Water control valves in the return line shall be brass body two-way valves with 24 volt operators and shall be equipped with a normally open end switch. The maximum opening time shall be 65 seconds. The maximum pressure drop through the valve shall be 2 psi. Control valves shall be manufactured by Belimo, Honeywell, Taco or Victaulic/Tour & Andersson. Water control valves are provided under section 155000, installed under this section and wired under section 155000.
- G. Balancing valves shall be bronze or cast iron with bronze disc valve equipped with readout valves for connecting a differential pressure meter. The balancing valve shall have an indexing pointer and a calibrated nameplate to indicate the correct setting. Balancing valves shall be Accu-flo, American Wheatley type BV, Armstrong Type CBV, Bell&Gossett Type CB, Flow Design type AS, Presco type B+, Taco type ACUF, Victaulic/Tour & Andersson STA or Watts CSM.

2.30 GAUGES AND THERMOMETERS

- A. Pressure gauges shall be the Bourdon tube with 4 1/2" white dial with black graduations and with stainless steel or aluminum case with clear plastic front. The gauges shall be installed in a manner so that they may be easily read from the floor and each gauge shall be installed with a bronze mini ball valve.
- B. Pressure ranges shall be as follows:
- | | | |
|----|-----------------------------|----------------|
| 1. | Chilled and hot water pumps | 0-100 psi |
| 2. | Cooling Tower pumps- | 30"Hg-0-60 psi |
| 3. | Loop water pumps | 0-100 psi |
- C. Gauges shall be Weksler type EA 14 with and accuracy of +/- 1% over range, or approved equal by Ashcroft, Miljoco, Palmer, Watts, Weiss or Winter.
- D. Thermometers shall be the bi metal 5" dial type constructed of stainless steel or aluminum case, ring, and stem, with clear plastic front and adjustable angle head. Thermometers shall be installed in a manner that they may be easily read from the floor and shall be the separable socket type. Thermometer wells constructed of brass shall be provided for each thermometer.
- E. Thermometers shall be Weiss DVU35 digital type with glass passivated thermistor light sensor, LED display and 3 1/2" stem.

2.31 WATER SPECIALTIES

- A. Expansion tank shall be a pressurized diaphragm type, constructed of heavy gauge steel with welded ends and seams for 125 psi working pressure and shall have an ASME stamp. The tank shall be of the size and capacity indicated on the drawings and shall be as manufactured by Armstrong, Bell & Gossett, American Wheatley, Amtrol, Taco or Watts.
- B. Automatic fill valve shall be a Armstrong C-11 or Bell & Gossett model F 8 combination fast fill pressure reducing valve and pressure relief valve or approved equal by American Wheatley, Taco or Thrush.
- C. Separator shall be an air and dirt separator with integral automatic air vent, coalescing medium, blowdown valve and removable end cover. The unit shall have internal elements to suppress turbulence and provide minimum dirt separation efficiency of 80% of all particles 90 micron and larger within 100 passes and remove entrained air down to 18 microns. Recommended max. flow through separator shall exceed the flow of the system. Air-dirt separator shall be as manufactured by Spirotherm or approved equal by Armstrong, Bell & Gossett, American Wheatley, Taco, Thrush or Watts.

- D. Reduced pressure double check valve type backflow preventer shall be installed in the make up water line and shall be Watts 009-QT or approved equal by Apollo, Lawler or Hersey.
- E. Strainers shall be cast or ductile iron with stainless steel 20 mesh screens and shall be rated at 300 psi.
- F. Automatic air vents at the ends of the mains and at high points in the systems shall be Bell & Gossett No. 87 or approved equal by Armstrong, Hoffman or Taco.
- G. Automatic air vents at the air separators shall have a capacity of 7.5cfm @ 12psi pressure. Automatic air vents shall be high capacity vents, Bell & Gossett No. 107, Armstrong AAE-750 or two Taco 409 vents.
- H. Sight flow indicators shall be Johnson Corporation Thru Flow, type TSF series or approved equal. Sight flow indicators shall be constructed of cast iron with Pyrex glass tube sealed into machined grooves. Indicator shall have an inside diameter equal to the nominal pipe size and shall be rated for 70 PSIG and 250°F.
- I. Pot feeder shall be a 5 gallon feeder. The feeder shall be rated for a working pressure of 300 PSI at 200°F. The feeder shall have a 3 ½ " opening and a lid that opens with a quarter turn. Feeder shall be J.L.Wingate furnished by Aquatrol or approved equal.

2.32 INSULATION

- A. All insulation shall have composite maximum flame spread rating of 25 and maximum smoke developed index of 50 as required by NFPA 90A. Duct liner shall comply with U.L. 181 Erosion Test. Accessories, such as adhesives, mastics, cements, or tapes shall have the same component ratings as listed above.
- B. Air conditioning supply and return and outside air supply and intake ducts constructed of galvanized steel shall be insulated with 2" inch thick 0.75 PCF density fiberglass blanket insulation with a "R" of 6.0 "out of package" and with foil scrim kraft vapor barrier. Insulation shall be secured to the duct with 17 gauge galvanized steel wire, spiral wrapped around the duct at 12" on center. Where ducts exceed 24" in width, install stick pins and speed clips on the bottom of the duct at 12" on center. All joints and seams shall be sealed with 3" wide foil scrim kraft tape.
- C. Air conditioning or heating supply and return ducts exposed in a conditioned space shall be lined, not externally insulated.
- D. Energy recovery unit exhaust ducts inside the conditioned building shall not be insulated. Supply duct shall be insulated.

- E. Where indicated on the drawings, supply and return air ducts inside the building shall be lined with 1-1/2" thick, 1.5 PCF density fiberglass duct liner with a "R" of 6.0. Duct liner shall be secured to the duct with adhesive and additionally secured with stick pins and speed clips on a maximum of 15 inch centers. Duct sizes shown on the drawings are clear inside dimensions after liner is installed.
- F. On ducts and plenums where liner is installed, omit the external insulation.
- G. Condensate drains inside the building and refrigerant suction line piping shall be insulated with flexible elastomeric closed cell insulation with adhesive sealed seams and joints or polyolefin or polymer foam pipe insulation with self sealing seam and adhesive sealed joints. Each type of insulation shall be installed in accordance with the manufacturer's published instructions. All joints shall be miter cut and sealed. Insulation shall have a k factor not to exceed 0.27 @ 75°F. Insulation shall be 1/2" thick. Pipe hangers shall be increased in size to fit over the insulation. At each pipe hanger install a 12" long, 22 gauge galvanized steel saddle to protect insulation. Where condensate drains are exposed inside the building and refrigerant piping is exposed inside or outside the building, insulation shall be protected by installing a 0.016" aluminum jacket over the insulation.
- H. Insulate both refrigerant lines on ductless split systems.
- I. Cooling tower cold water make-up piping, supply and return water piping, and drain piping up to ball valve, installed outside the building shall be insulated with 1-1/2" thick cellular glass pipe insulation. The insulation shall be covered with fiberglass cloth and two coats of black asphalt mastic and shall be weatherproofed by installing a 0.016" aluminum jacket over the insulation.
- J. Cooling tower supply and return water piping installed underground shall be covered with a shop wrap of polyethylene tape with a minimum wrap thickness of 25 mils. All joints and other exposed sections shall be field wrapped with wrap equal to shop wrap.

2.33 HEAT TAPE

- A. Heat tape shall be installed on all cooling tower supply, return, makeup water piping, and drain piping up to ball valve, which is exposed outside the building and water level controller piping. The heat tape shall be installed on the pipe before the pipe is insulated.
- B. Heat tape shall be Raychem 8XL 1 self regulating type, 8 watts per foot, 120 volt. Install at the rate of one foot of tape per foot of pipe. Provide a AMC-1A mechanical thermostat, RayClic-PC power connection kit and RayClic-LE lighted end seal on each cable end. Approved equal tape by Chromalox or Thermon is acceptable.

2.34 LABELING

- A. Each piece of mechanical equipment installed outside or on the roof or in mechanical rooms shall be labeled to indicate the unit number as indicated in the equipment schedules on the drawings and also list the room name & number that the thermostat or sensor is located. Labels shall be Bakelite laminated plastic with 2" high white letters on black background. Labels shall be fastened with non-corrosive metal fasteners.
- B. Each piece of mechanical equipment mounted above lay-in ceilings shall be labeled to indicate the room number of the primary room served by the unit. Labeling shall be pre-printed vinyl film with permanent adhesive. Numbers shall be minimum 2" high.
- C. All piping shall be labeled to indicate the system type. Labels shall be installed at 40 feet on center on circulating water, cooling tower water and hot water supply and return piping. Labels shall be self sticking pipe markers with black letters and arrows to indicate the direction of flow. Labels shall be W. H. Brady style B 946 or approved equal by Mifab, T&B Westline or Seton.

2.35 AIR FILTERS

- A. The Contractor will coordinate initial filter installation along with filter changes as necessary during the Construction Phase starting at the point of Test and Balance (T&B) through Final Inspection. The initial filter installation and filter maintenance on all school system projects shall be performed by the vendor selected by the Owner through competitive pricing agreements. Contact the Facility Planning Department for the vendor currently under agreement with the Owner for these services.
- B. The Contractor shall be responsible for contacting the Owner's vendor and coordinating filter installation in HVAC equipment. The Contractor is not responsible for any payments to the filter vendor for their services from the point of T&B through Final Inspection.
- C. No HVAC equipment shall operate until Owner's filters are in place. If necessary to operate the equipment during Construction Phase for heat and/or dehumidification prior to T&B, obtain owner's written approval. Contractor is responsible for cost of filter installation and maintenance through the Owner's vendor, at the Owner's agreed pricing, prior to the point of T&B.

2.36 ELECTRICAL

- A. Motors, motor starters, controls, relays, contactors and switches required for proper operation of equipment covered under this section, except items specified furnished under the Electrical Section, shall be furnished under this section of the specifications. Devices which are a part of the power wiring circuit and which are not integral parts of the equipment, shall be installed under the Electrical Section.
- B. All control and interlock wiring shall be furnished under DDC Section.
- C. Power wiring, unless otherwise indicated hereinbefore, shall be furnished and installed under the Electrical Section.

PART 3 – EXECUTION

3.1 BOILER INSPECTION

- A. The contractor shall have the boiler inspected by a State of Georgia certified boiler inspector. The inspection report shall be submitted to the Office of Insurance and Safety Fire Commissioner, Fire Safety Division, 2 Martin Luther King Jr. Drive, Suite 920, West Tower, Atlanta, GA 30334.
- B. The Office of Insurance and Safety Fire Commissioner will place a tag indicating the state serial number on the boiler and issue a certificate of boiler or pressure vessel inspection. The original certificate is to be posted in the boiler room.

3.2 TESTING OF EXISTING SYSTEMS

- A. Prior to beginning work, the Contractor shall test airflow on existing equipment in systems where duct will be modified. Report any deficiencies in airflow to the Consulting Engineer.

3.3 TESTING AND BALANCING

- A. The Owner, The Gwinnett County Public Schools shall obtain the services of an independent test and balance agency that specializes in and whose business is limited to the testing and balancing of air conditioning systems.
- B. The Contractor shall cooperate with the test and balance agency and shall provide the following:
- C. Notify the Architect when the system is completely installed and ready for testing and balancing.
- D. Provide shop drawings of all equipment furnished.

- E. Start all equipment and provide all labor required to keep it in good working order during the test and balance procedure. Provide clean filters in each unit at the start of the procedure.
- F. Make all adjustments necessary to the equipment including changing belts and pulleys or motor speed taps on fan systems so that the equipment can be balanced to deliver the air quantities specified on the drawings.
- G. Do all work listed in the Testing and Balancing Readiness Checklist located on the next page.

TESTING AND BALANCING (TAB) READINESS CHECKLIST FOR: JOB NAME

Attention: General Contractor (GC) and Gwinnett County Project Manager (PM)

Please complete the following Project readiness checklist to indicate that all systems are ready for Test and Balancing. Once the checklist is complete; the GC will send it by email/fax to the architect and Gwinnett County Public School's construction coordinator for scheduling. Please note that we will not schedule to be on site without this completed readiness checklist. Please provide a minimum two week notice to schedule testing and balancing.

	Yes	No	DATE	Initials	Comments
Field verify that all HVAC equipment is fully operational and under control					
Ductwork complete					
Balancing dampers installed and wide open, includes smoke and fire dampers					
Grilles, registers, diffusers installed					
Outside Air dampers ready for TAB					
The filters are clean					
The exhaust fans and hood fans are running					
Grease filters installed in exhaust hoods					
Exhaust/Relief fan-Rotation/Operation confirmed					
Air Curtains running and thermostats wired					
All units heaters are operational (gas or AC)					
All HVAC Controls are complete and operating					
RTU/AHU/MAU/ERU/ERV-Startup is complete and fully operational					
RTU - Heating/Cooling sequence confirmed					
RTU correct fan rotation confirmed					
ERU's exhaust fan, supply fan, and heat wheel are operational.					

*I CERTIFY THAT THE ABOVE ITEMS HAVE BEEN CHECKED AND THAT THE SYSTEMS ARE READY FOR TESTING AND BALANCING. I FURTHER UNDERSTAND THAT IF ADDITIONAL TRIPS ARE NECESSARY TO COMPLETE TAB (MORE THAN 2 VISITS TO EACH ITEM AS INDICATED BY CONTRACT) A *BACKCHARGE WILL BE INCURRED.*

GC Signature

Printed Name

Company Name/Contact's Cell No.

Date

Architect

Date

*Backcharge(s) are issued for daily rates only@ \$800/Day

End of Section 154000

East Addition to North Gwinnett High School, Gwinnett County, GA

SHL-D01-21

SECTION 155000 - DIRECT DIGITAL CONTROL SYSTEMPART 1 - GENERAL1.1 CODES

- A. Work covered by this section of the specifications shall conform to the International Mechanical Code, 2018 Edition with subsequent Georgia State Amendments.

1.2 SUBMITTALS

- A. Where equipment is specified herein or on drawings, by manufacturer's names or numbers, this shall denote minimum requirements as to quality, type, capacity, function, and performance. All equipment must have the Engineer's approval before ordering.
- B. Submittals shall be submitted in electronic *.pdf format. File name shall include the job name, specification section and date of the submittal. Submittals containing multiple items must include a table of contents with hyperlinks to the cover page for each item. The cover page for each piece of equipment shall itemize equipment features to show compliance with or deviation from the requirements contained in the specifications and drawings. If the supporting product data is more than ten (10) pages long, include hyperlinks on the item's cover page to the supporting information.

1.3 OPERATING INSTRUCTIONS

- A. The Contractor shall furnish not less than three (3) copies of operating and maintenance instructions for all equipment he has furnished and installed.
- B. All keys, operating manuals, maintenance instruction manuals and parts information shall be turned over to the Gwinnett County Public Schools Director of Construction and a signed receipt obtained.

PART 2 - PRODUCTS2.1 SYSTEM DESCRIPTION

- A. The Direct Digital Temperature Control System (DDC) shall be an integrated, fully operational temperature control system and building management system as herein specified. Gwinnett County Public Schools (Owner) currently has certain system equipment installed at its central office and at each school facility. Equipment provided under this Specification shall be compatible with a Triac control system and shall be completely integrated with the existing hardware and software. The Contractor shall have full responsibility for all work necessary to satisfy the requirements of this Specification, including hardware and software integration.

- B. The DDC System shall be a computer-based direct digital control system consisting of a central control unit (CCU) located at Owner's central maintenance center and district shops, multiple remote site units (RSU), and unitary device controllers (UDC). Equipment shall be installed in the school as required to provide temperature control energy management and demand control, scheduling, and the control and monitoring of all points contained in the Facility Survey. The CCU, RSUs, and UDCs shall make up a distributed processing control system with all hardware and software being provided by the Contractor. All hardware and software provided shall be fully integrated and compatible with the Owner's existing system.

2.2 SCOPE OF WORK

- A. The equipment and services to be provided under this section shall include the following:
1. Direct digital temperature control of all heating, ventilating and air conditioning equipment using unitary (Triac) controllers with Triac outputs,
 2. Lighting control using UL-listed lighting relays connected to the Water Source Heat Pump (WSHP) controller which monitors the occupancy sensor, and fully integrated with the EMS network and operator work stations,
 3. Control and monitoring of all other equipment as shown on the control point list,
 4. Energy optimization using timing schedule, optimal start-stop, temperature setback, duty cycle control, and DDC,
 5. Automatic two-way communication between the school and the existing central maintenance office computer system using the Owner's existing Ethernet LAN to provide real-time, remote operator access, automatic transfer of all logs and reports to the existing central MIS system, and remote alarm reporting, and provide a wireless backup communications path with one year service agreement.
 6. Preparation of project drawings, wiring diagrams, and database generation as required to store as-built documents on Owners system,
 7. Check out and start up of the system including demonstration that all systems are operational in all modes and integrated with all existing systems. Check-out test Documentation shall be stored on Owner's data system.
- B. The Control Contractor shall furnish weekly status updates of systems to all parties; Mechanical and General Contractor, Architect, Engineer and Owner to provide information to the parties as it relates to the completion status of the system including reports and commissioning information.

2.3 ACCEPTABLE MANUFACTURERS

- A. The manufacturer for the automatic controls is H I SOLUTIONS, 4040 Royal Drive, Kennesaw, GA 30144. Contact - Harold Ivester (770-423-1150).
- B. All automatic controls shall be installed by the Frazier Service Company who is the authorized installer/dealer for the manufacturer. Contact – Rod Powell (770-455-8340).

2.4 TRAINING

- A. The Contractor shall provide, at no additional charge, a minimum of 8 hours of on-site instruction to familiarize Owner personnel with the capabilities, operation, and routine maintenance of the DDC system. The instruction shall include equipment functional descriptions, installation procedures, system start-up, system operation, and general system troubleshooting. All instruction shall be provided by factory-trained personnel.
- B. The Contractor shall provide a tuition free, five day operation and maintenance course at the factory training center for a minimum of two persons. The course shall include classroom instruction using published manuals and laboratory experience using operational systems like that delivered to Owner.
- C. Contractor shall provide operation and maintenance manuals for the DDC system and all peripheral equipment. Updates to all manuals shall be provided free during the warranty period. This information shall be stored on the Owners electronic data system.

2.5 WARRANTY

- A. Contractor shall provide a one year labor and material warranty for all equipment and software. The warranty shall include on-site service and equipment repair or replacement at no charge to Owner. Response time of maintenance personnel shall not exceed 24 hours after notification of Contractor that service is needed. The warranty period shall begin on the date of “Substantial Completion”.
- B. Contractor shall provide factory-trained personnel to service the DDC system and maintain a reasonable local stock of replacement parts to assure prompt and dependable repair of DDC system equipment problems.
- C. The Contractor and Manufacturer shall maintain a service center with equipment capable of communicating with the RSUs and the CCU to assist Owner personnel using Ethernet. Such remote service support shall be provided at no charge to Owner’s training personnel dial-up telephone access.

2.6 OWNER PROVIDED ITEMS

- A. The Owner shall provide the following items in coordination with the Contractor:
1. Ethernet RJ45 connection to Owner's network with a static IP address.
 2. A 120 volt power supply to feed the RSU panel located in the main server room and wired through the emergency power system. All other sources of 120 volt power for controls shall be provided in this Section.

2.7 SYSTEM ACCEPTANCE

- A. The system acceptance procedure shall include as a minimum the following requirements:
1. Demonstrate all specified capabilities of the CCU, RSU, and UDC,
 2. Demonstrate all operator commands and program features,
 3. Verify that all control points, status inputs, and analog inputs can be controlled or monitored from the RDC, RSU and CCU locations,
 4. Verify that all alarm inputs are properly handled,
 5. Demonstrate program loading and parameter modification,
 6. Demonstrate program integrity after power failure,
 7. Demonstrate telephone and network communications between CCU and all RSUs whether initiated by the CCU or the RSU,
 8. Demonstrate capabilities required by Specification but not initially installed in accordance with the Facility Survey.
 9. Demonstrate the automatic generation and delivery of all required reports.

2.8 CENTRAL CONTROL UNIT (EXISTING)

- A. The Owner currently has in operation a CCU containing a computer with sufficient memory, operator terminal, printer, automatic dialing unit, and software for all specified capabilities. The CCU is capable of communication with up to 199 RSUs by means of Ethernet using the Owner's EMS LAN network, and a wireless path where Owner's network is not available.
- B. The existing CCU is the H I SOLUTIONS Field Commander Building Management System including the PC Central Management Information System with dynamic status display, automatic data collection and analysis, and global communications.
- C. Central CCU and remote maintenance center CCUs must operate in a wide area network using the Owner's network to provide for specific regional control as well as full information sharing between regional maintenance centers.

- D. The existing CCU shall coordinate all alarm and advisory messages from remote sites. Messages shall be logged into an historical database and redirected to specific maintenance centers based upon the site reporting and the type of message. The CCU alarm system shall record processing information into the historical database and produce basic management alarm summary report. The CCU shall also be able to redirect owner selected alarms via e-mail or pagers.
- E. The CCU shall coordinate all scheduling of zones through the existing Lotus Notes e-mail schedule request forms. Remote site controllers must interface with the existing schedule formats and handle all required automated schedule updates and confirmation sequences.
- F. Flex-graphics Web pages of remote sites shall be provided on the CCU or RSU web server. The site web pages shall include current operating conditions for the building mechanical systems. Detailed room information for each room shall be provided for current status of fan, heating and cooling, supply air temperature, set-point, and any other critical point. The web pages shall also provide access to selected site historical trend information in either a web page or PDF format. Site web pages shall be viewable and editable using an industry standard web browser from any computer connected to the owner's network once the user has properly logged in.

2.9 REMOTE SITE UNIT

- A. The RSU shall be a computer-based unit capable of operating as a stand-alone system for single building control and as an intelligent remote site controller in a distributed processing system. The RSU shall be fully compatible with the Owner's existing CCU hardware and software and shall perform energy control functions such as demand control, equipment scheduling, duty cycling, reporting, analog and digital monitoring, optimization, and direct digital control. The system shall provide temperature control of heating, ventilating, and air conditioning units, Area Network (LAN) and two way wireless communications, modem and Local interfaces for communications between multiple remote site units, remote device controllers, and unitary device controllers.
- B. The RSUs installed in Owner's existing schools are the H I SOLUTIONS Field Commander Building Management System Model FC-7.

2.10 UNITARY DEVICE CONTROLLER

- A. Unitary Device Controllers (UDC) shall be provided as required to control all equipment as specified on the control point list. The UDC shall communicate with the RSU through its RS-485 LAN at 9600 baud via a 2-wire network. The UDC shall be a complete control subsystem with microprocessor, memory, control programs, and user-defined application programs. All UDCs shall be identical in hardware and software with the exception of user-defined databases so that only one type of spare board is required.

- B. The following description shall apply to all UDC controllers whether controlling a roof top unit, heat pump, central loop or other HVAC equipment:
1. The Unitary Device Controller (UDC) shall be a complete control subsystem including microprocessor, power supply, 10 year battery backed RAM memory, real time clock and calendar, input-output interfaces, LAN interface, Soap/LAN Bus Extender interface device, and firmware.
 2. The LAN interface shall be an industry standard RS-485 network communicating at 9600 baud on a single pair line to the RSU. Up to 120 UDCs shall be able to operate on the same pair with the RSU. LANs shall be configured as to have approximately 40 controllers on each LAN. Each controller shall be functional as an independent control system or as an integrated subsystem of the RSU when connected to the RSU LAN.
 3. The UDC shall provide plug-in support for two remote thermostats to allow independent temperature control of two zones. A compatible thermostat shall be provided with space temperature sensor, timed override switch, override indication LED, and software-controlled local temperature adjustment.
 4. Unitary controllers shall be provided as indicated on the project drawings. All UDCs supplied under the Specification shall be identical in hardware and software, with the exception of user-defined facility database so that only one type of spare board is required. Systems that use dedicated design or firmware for a particular unitary function are not acceptable. There shall be no address jumpers, configuration switches or field calibration pots on the controller.
 5. The unitary controller shall operate from 24 VAC using a separate control transformer or power from the controlled equipment of 24 VDC external power source. The power input shall be protected from power transients.
 6. The unitary controller shall be track-mounted in a standard 3.25 inch PVC track. All wire connections shall be made using plug-in screw terminal blocks which allow the board to be exchanged without disconnecting any wires. Optional thermostats shall be located up to 50 feet from the controller using quick disconnect cables.
 7. The unitary controller shall provide the following control capacity:
 - a. Digital Outputs - UDCs shall provide eight digital outputs with opto-isolated triac drivers. Each digital output shall have a corresponding LED to indicate its status.

- b. Digital Inputs - The UDC shall provide 12 opto-isolated digital input devices with status LEDs. One of the digital inputs shall also be associated with counter registers.
 - c. Analog Inputs - UDCs shall have eight universal digital / analog inputs. Analog inputs shall have a full 10-bit analog-to-digital resolution. UDCs with 8-bit resolution are not acceptable.
 - d. Analog Outputs - Three channels of analog outputs with a full 10-bit digital-to-analog conversion shall be provided. Analog outputs shall be 4-20 MA or 0-10 VDC. The controller shall provide 15 VDC output for use with externally powered transmitters, humidity sensors, and other powered devices. UDCs with 8-bit resolution are not acceptable.
8. DDC setpoint control shall be provided for the analog outputs. Each setpoint shall have full PID control and shall function in either a fixed base or floating mode.
 9. UDCs shall be programmed with the CCU via Owner's LAN network or dial-up phone lines. In addition, a portable computer shall be attachable to the UDC LAN at the controller, thermostat, RSU or any point on the UDC LAN. The computer shall also monitor activity, directly command any UDC, change parameters, or upload/download database parameters.
 10. The UDC shall network with other UDC networks via fiber LANs to allow multiple "islands" of UDCs to function as an integral network.

2.11 SENSORS AND CONTROLS

- A. All analog sensors, control relays, and status sensors shall be provided to properly interface the UDCs with the building equipment as specified in the Facility Survey. The sensors and controls shall be new equipment installed in accordance with the manufacturer's recommendations.
- B. Temperature Sensors:
 1. Temperature sensors shall be Platinum Resistance Temperature Detectors (RTD) or Thermistors with a temperature range of -30 degrees F to 275 degrees F. Sensors shall be wire-wound platinum with a nominal resistance of 100 ohms at 32 degrees F or 10k thermistors with a nominal resistance of 10,000 ohms at 77 degrees F. Interchangeability tolerance at 70 degrees F shall not exceed 0.75 degrees F without field calibration. Wiring from RTD sensors shall be 3-wire or 4-wire configuration to minimize lead wire resistance effects. All temperature sensors shall be supplied by the manufacturer.

2. The sensors shall be housed in enclosures appropriate for the application. As a minimum, four types shall be available:
 - a. Molded executive plastic unit suitable for wall mounting to sense room space temperatures;
 - b. Metal thermowell unit suitable for mounting in pipes to sense chilled and hot water temperatures;
 - c. Metal duct mounted unit suitable for mounting in air ducts; and
 - d. Metal outside air unit with sunshield and housing suitable for mounting outdoors.
 3. Provide metal guards on wall mounted sensors in Gymnasiums and Locker Rooms.
 4. Sensors with insertion-type housing shall provide 3, 6, 12 or 18 inch insertion depths as required for best temperature sensing.
- C. Control Relays:
1. Control relays shall be 24 VAC coil-operated devices with contacts rated for the voltage and current requirements of the equipment to be controlled. Relays shall be plug-in type with sockets having screw terminals for control circuits of 10 amps or less and non-plug-in type for control circuits exceeding 10 amps. Contact configuration shall be as required to properly interface with controlled equipment. All relays shall be UL listed.
- D. Status Sensors:
1. Status sensors shall be provided for all controlled equipment. Dry contact status inputs shall provide binary state information from the following types of equipment:
 2. Air flow status for air handlers, fans, and blowers shall be sensed by differential pressure transducers properly sized for the flow sensors unless otherwise specified as digital binary switches;
 3. Liquid flow status of chillers, boilers, and pumps shall be sensed by differential pressure switches rated for media and pressure unless otherwise specified as flow transducers;
 4. Equipment status of chillers, boilers, lights, heaters, alarm annunciators shall be sensed by auxiliary relay contacts; and
 5. Temperature condition of coolers and freezers shall be sensed by analog temperature sensors unless otherwise specified, as setpoint thermostats.

E. Humidity Sensors:

1. Humidity sensors shall be ultra fast response polymer capacitance or other Owner approved sensor type with internal temperature compensation. The sensor shall measure the range 0 to 100% RH with an accuracy of +/- 3% RH between 15 and 95% RH. Duct sensor housing shall be stainless steel with mounting brackets as required to protect the sensor and provide proper orientation to the air flow. Wall mounted sensors shall be an executive molded plastic style housing.
2. Provide and install one sensor per ERU/HRU for each floor the unit serves . Locate sensor near center of area being served by the ERU/HRU. Sensor should be connected to the nearest ERU/HRU controller. Other sensors shall be mounted at locations as shown on the drawings.

F. CO2 Sensors:

1. CO2 sensors shall have a range of 0 - 2000 ppm. Accuracy shall be within 50 ppm in a 60 - 90 degree F range with a maximum drift of 10 ppm per year.
2. Provide and install one sensor per ERU/HRU. Locate sensor in the exhaust air of the ERU/HRU. Sensor should be connected to the nearest ERU/HRU controller.

G. Hazardous Air Sensor:

1. Sensor shall be capable of monitoring levels of chlorine, methane and benzene.

2.12 NAMEPLATES

- A. Each major item of equipment shall have the manufacturer's name, model number, and serial number permanently attached to the unit.
- B. Label the ceiling grid to identify each UUC location.

2.13 COMPLIANCE

- A. Wireless modems shall be FCC approved for direct connection to the network. The certification number shall be permanently displayed on the modem housing.
- B. All controllers and equipment shall be UL-916 Listed and FCC approved as required.

2.14 SOFTWARE

- A. The Contractor shall provide all software programs required to provide a completely operational system as described in this Specification. Distribution copies of all software shall be provided on CD-ROM or DVD disks for loading into the CCU hard disk. Duplicate copies of all disks shall be provided.

- B. Each system shall included the latest Device Explore software.

2.15 FACILITY INFORMATION CENTER

A. Facility Information Center

1. The DDC Building Management System shall be provided with a Facility Information Center (FIC) located in the main server room or other locations as approved by Owner. The FIC shall be fully integrated into the DDC system using an industry standard web browser to provide local and remote access to all status information for the facility. The FIC shall be fully compatible with the Maintenance Center Management Information Center and shall, in no way, interfere with any of its present functions. The FIC/RSU shall support remote LAN Bus Extenders/UEIs using fiber optic LAN cabling provided and installed by the contractor.
2. The system shall provide system diagrams with equipment status, environmental conditions, alarms, equipment manuals, installation drawings, and help information.
3. The FIC shall communicate automatically with the DDC system and interrogate the BMS to obtain the information requested by the operator or the automatic graphics displays.
4. The FIC shall archive trend information being collected by the UUC controllers.

B. FIC System Hardware

1. The FIC shall include an embedded computer capable of running Microsoft Windows or Linux operating syste and compatible application programs. Hardware shall be provided to achieve system functionality as required including processor, memory, disk storage, and network communication ports.
2. The computer hardware shall be the product of the manufacturer compatible with the RSU and Owner's existing CCU.
3. All LAN's and all controllers shall be accessible from the FIC location.
4. The FIC shall provide a BACNet IP port for communications with E-Mon sub-meters or other devices.
5. The Operator Input Device shall be an interactive self-contained touch screen. The colorgraphic screen shall provide selection windows guiding the operator to the desired information.

C. FIC System Software

1. The FIC shall include the software required to meet the functional requirements including the information display and service center capabilities.
2. The FIC software shall provide user-friendly display of facility status information including:
 - a. Alarms
 - b. Heating/Cooling System and Equipment Status
 - c. Space and System Temperatures
 - d. Facility Schedules
 - e. Electrical Demand and Energy Usage Displays and Graphs
 - f. Trend Logs
 - g. Equipment Run Time
 - h. Help Screens with General Facility Information
3. The software shall provide web based display of HVAC systems overlaid by dynamic status information such as space temperatures and equipment operating modes and associated alarms.
4. The FIC shall provide an automatic scan mode to present sequential information displays without operator intervention. The presentation shall continue until interrupted by the operator. An automatic standby mode shall be provided to shutdown the display after a pre-selected time. Displays shall be provided to present system information relating to “green building” technologies and resulting savings such as green house emissions avoided.
5. The FIC shall provide automatic collection of databases from the DDC system. Databases for all controllers shall be stored on the FIC hard disk.
6. The FIC shall provide remote access from the owner’s CCUs for maintenance updates through a VNC connection.

2.16 LOOP WATER CONTROL PANEL

- A. The circulation loop water control panel shall be provided to control and monitor the water-source heat pumps water circulation system. The panel shall provide both integrated automatic control and manual backup control. The panel shall have a NEMA 1 type enclosure made of 14 gauge steel with locking door.

- B. The front of the panel shall have lights to indicate “High Temperature”, “Low Temperature”, and “No Flow”. A digital temperature shall display the temperature of the loop water. The panel shall be protected with a circuit breaker properly sized to power the entire panel electrical power requirement. The control panel shall be capable of handling multiple loops.
- C. The panels shall be factory-wired, tested, and delivered to the job-site ready for field connection. No field wiring except interconnection to associated field wiring shall be required. All wiring shall be in wiring duct arranged neatly with cover. The panel shall have wiring duct on the outside of each row of terminal blocks so that when the field wiring enters the panel, it can be terminated at the terminal block and covered. Power input wiring shall be on the left side and marked as such.
- D. The panel shall provide automatic control functions using UDC controllers connected to the U-LAN. All controllers shall be installed in the panel using snap track. The power to each controller shall be protected with a 5A panel mounted circuit breaker. All inputs and outputs shall terminate at a terminal block within the panel.
- E. The Loop Water Panel shall provide the following:
1. Digital Section – The panel shall be arranged so that all digital outputs and inputs shall terminate on the right side of the panel. There shall be a minimum of 16 digital Triac outputs and 32 digital inputs. Each DO shall be hard wired through a Hand-Off-Auto switch and 24 VAC plug-in relay contact and terminated on a terminal block. Each relay shall have a pushbutton for testing and a light for status indication. Relay contacts shall be 5 A. minimum. The terminal blocks shall be arranged so that digital outputs are grouped together and digital inputs are grouped together, according to the controller they are assigned.
 2. Analog Section – All of the analog inputs and outputs shall terminate at terminal blocks on the left side of the panel. There shall be a minimum of 6 analog outputs providing 0 – 10 VDC or 4 – 20 MA control. There shall be a minimum of 16 universal analog/digital inputs.
 3. Time Delay Circuit Section - The panel shall provide a minimum of 8 time delay relays each with adjustable timing. Each time delay circuit shall terminate at a terminal block in the panel. The time delay circuits shall have a “system start delay” and “loop flow switch delay” so the time delay circuits may not activate until the time of day schedule and loop water flow switch is activated. A minimum of two Honeywell T678A manual controllers shall be provided for manual control of the boiler and cooling tower for emergency back up use only.

2.17 VARIABLE FREQUENCY DRIVE

- A. A variable frequency drive shall be provided for the pumps and cooling tower fan motors as scheduled on the drawings. Horsepower and voltage shall be as shown on the drawings.
- B. Drive enclosure shall be U.L. listed and NEMA 1 rated and shall be constructed of steel with a baked enamel finish. Selector switches, LED display, keypad and pilot lights shall be mounted in the door. The key-pad shall be removable and capable of remote mounting.
- C. The key-pad shall include Hand-Off-Auto selections and manual speed control.
- D. The VFD shall have a programmable loss of load output through a Form-C relay, keypad warning or serial communication bus.
- E. The VFD shall have the following adjustments:
 - 1. Run permissive circuit
 - 2. Programmable time delay
- F. The VFD shall have an EIA-485 port with Modbus or BACnet protocol for connection to the building EMS.
- G. The VFD shall have EMI/RFI filters.
- H. The VFD shall have a by-pass system consisting of a circuit breaker, output contactor, by-pass contactor and VFD isolation fuses.
- I. The VFD shall provide motor overload protection and phase loss protection in both VFD and by-pass operation.
- J. The by-pass shall be monitored and/or controlled by the serial communication bus.
- K. The by-pass feature shall be both manually and remotely selectable by the building EMS. The feature shall allow the remote operator to select to operate the motor at full speed from the AC line power.
- L. The drive shall control the pressure in the piping system by controlling the speed of the pump. The drive shall control the temperature of the water leaving the cooling tower by varying the speed of the tower fan motor. Provide a communications connection for the building energy management system.
- M. Start-up and checkout by a factory authorized representative shall be provided. Cooling tower fans must not operate at certain speeds which produce harmonic frequencies. The cooling tower manufacturer will provide the speeds to be avoided. The drive shall be programmed to avoid these speeds. A report shall be provided indicating the drive has been properly installed, set-up and is operating satisfactorily.

- N. The drive shall be a model ACH as manufactured by ABB or approved equal by Yaskawa.
- O. Install Bakelite plastic labels, black with 1/4" high white letters, on the cover of each motor starter to identify the motor served by that starter.

2.18 FLOW SENSORS

- A. Flow sensors shall be Badger Meter SD1 series flow sensors with integral transmitter.

2.19 WATER METERS

- A. Water meters shall be a Hersey Model 400 Series IIIS or Niagara model 420-1" meter with electronic register with pulse output. Approved meters by Garratt Callahan, Sea-Metrics or DSL are acceptable.

2.20 MOTION SENSORS

- A. Motion Sensors shall be Bosch OD850 DualCore sensors which have both K-Band microwave technology and Uniform Sensitivity Optics to sense motion. Motion sensors shall be furnished and installed under this section of the specification.
- B. Relays in lighting circuits shall be RIBTE relays as manufactured by Functional Devices Inc.. Relays shall have single or 2 pole contacts, 120 volt or 277 volt and required by the Electrical drawings. Control input shall be 24 volts AC/DC. Relays shall be furnished under this section of the specifications and installed in the lighting circuits under the Electrical Section.
- C. All EMS occupancy sensors shall have the unitary address and point ID information, produced on a pre-printed adhesive label affixed to sensors.

2.21 IONIZATION SYSTEM

- A. Each Ionization device shall be capable of:
 - 1. Effectively controlling microorganisms throughout the building (mold, bacteria, etc.).
 - 2. Controlling ammonia to a level below 1.5 PPM.
 - 3. Maintaining a concentration of negative and positive ions at a level of 500-1500 negative ions per cubic centimeter in the primary space served by the device.
 - 4. Complying with U.L. 867 the maximum allowable ozone level shall not exceed the allowable ACGIH limit of 0.05 ppm as published in ASHRAE 62.1 2004, Appendix B.
 - 5. Submit test data showing ionization units inactivate COVID-19 by 99% in 30 Minutes.

- B. Submit the manufacturer's selected device for each size of air conditioning unit. Manufacturer shall calculate the required number of electrodes for each unit to provide acceptable indoor conditions at scheduled air flows in accordance with ASHRAE Standard 62.1. Calculations shall take into account the use of the space and any unusual odor problems such as in Cafeterias, Cosmetology Labs, Gymnasiums, Locker Rooms, Science Rooms, Shops, etc. The calculations shall be independently validated to verify accuracy of the IAQ calculations and conformance with Standard 62.1 by third party testing on a previous installation.
- C. The ionization device shall be needlepoint type and shall be suitable for mounting inside the unit in the fan inlet. Electrodes shall be constructed of carbon fiber brushes. Metal based electrodes are not acceptable. Electrical components shall consist of transformer, voltage regulation devices, malfunction alarm contact and isolation transformers required for proper operation of the device. The ionization device shall be installed downstream of a MERV 6 filter, minimum.
- D. The malfunction alarm device shall sense the production of ions and send an alarm when the number of ions drops below an acceptable limit.
- E. The unit shall be U.L. or ETL listed. Electrical wiring shall be in accordance with NFPA 70, NEC and when installed in a return air plenum shall be UL or ETL listed for installation in a return air plenum. Units shall operate on 24 volts and shall connect to the fan and common terminals of the unit served.
- F. A manufacturer's authorized representative shall provide start-up supervision and training of owner's personnel in the proper operation and maintenance of all equipment.
- G. At the completion of the project the manufacturer shall perform a system check by measuring the negative ion level in each primary space served by an ionization device and submit a report showing that the negative and positive ion level is within the specified limits. If any space fails to meet the criteria the manufacturer shall replace the ionization unit with one of the proper size.
- H. Provide to the owner a portable hand-held ion counter with a range of 0 to 20,000 ions and an accuracy of +/- 25% within the specified range.
- I. The ionization devices shall be as manufactured by Global Plasma Solutions, Bioclimatic Air Systems, Phenomenal Air or Plasma Air.

PART 3 - SEQUENCES

3.1 Refer to I/O Summary for control point description.

A. Temperature control for each single zone roof-top unit shall be as follows:

1. A control module shall be provided for each roof-top unit to control the fan, compressor, gas heat and & dehumidification cycle (if applicable) in the unit. A wall mounted temperature sensor located in the space shall provide an analog input signal to the control module. A wall mounted humidity sensor located adjacent to the temperature sensor shall be provided for units with a dehumidification cycle.
2. Each roof-top unit shall be programmed to start and stop according to the day/night schedule provided by the Owner.
3. The unit fan shall run continuously in the day cycle or cycle with a call for heating or cooling as programmed by the owner.
4. On a rise in space temperature above the cooling set point, the compressor shall start. Provide two stage control for units with two steps of capacity.
5. On a rise in space humidity above 50% the dehumidification cycle shall be energized on units equipped with the dehumidification cycle. If the space temperature drops below the heating set point while the unit is running in the dehumidification cycle the dehumidification shall be stopped.
6. On a drop in space temperature below the heating set point, the gas heat shall start.
7. In the night cycle the unit fan shall be off. On a drop in space temperature below the night setting of 55°, the fan and the gas heat shall start. The outside air damper shall remain closed in the night cycle.
8. Where shown on the drawings, room mounted CO2 sensors shall keep the outside air dampers closed when the CO2 level is below 1000ppm.
9. A duct mounted temperature sensor located in the supply air duct shall provide an analog input signal to the control module to provide temperature indication only.
10. A differential pressure switch connected across the supply fan shall provide a signal that the fan is running.
11. A 24 volt ionization device shall be connected to the unit so that the ionization device is activated whenever the unit fan runs.

12. A malfunction relay in the roof-top unit and Ionization device each have a normally open contact. Connect contacts in parallel to send a signal to the EMS if contact closes indicating trouble.
13. A duct mounted smoke detector, furnished as part of the Fire Alarm system and installed in the supply duct of each unit shall shut down the unit through an auxiliary contact in the smoke detector when smoke is present.
14. Where an occupancy sensor is provided in the room under the Electrical Section, connect the control module controlling the unit to the auxiliary contact in the sensor (one N.O., one N.C. rated at 1 amp at 24 vac). When the space is determined to be unoccupied by the sensor, change the heating and cooling setpoints for the unit to the unoccupied setpoints.
15. Where noted on the drawings, a hazardous air sensor shall close the outside air dampers in all units installed on this addition when sensor detects harmful chemicals.

B. Temperature Control for the circulating water loop shall be as follows:

1. When any water source heat pump unit on the loop is required to run, the primary circulating water pump P-1 shall run. Once started the pump speed shall be varied by a variable frequency drive (VFD). A differential pressure sensor in the loop piping shall provide a signal to the VFD. The pump shall maintain 20 psi differential pressure between the supply line and the return line.
2. Stand-by pump P-2 shall run on alternating days to equalize wear. Pump P-2 shall have a pressure sensor and variable frequency drive the same as specified for P-1. Should either pump fail to operate the other pump shall start.
3. Circulating water loop temperature shall be maintained on the supply side between 60°F and 90°F. When the loop supply water temperature rises above 86°F the cooling tower pump P-3 shall start. Once started the pump speed shall be varied by a variable frequency drive (VFD). A temperature sensor in the loop water supply line shall provide a signal to the VFD.
4. Stand-by pump P-4 shall run on alternating days to equalize wear. Pump P-4 shall have a temperature sensor and variable frequency drive the same as specified for P-3. Should either pump fail to operate the other pump shall start.
5. On a further rise above 86°F the cooling tower fan No.1 shall start. Once started the tower fan speed shall be varied by a variable frequency drive. A temperature sensor in the loop water supply line shall provide a signal to the VFD. Fan No.1 shall reach full speed at a water temperature of 88°F.

6. On a further rise above 88°F the cooling tower fan No.2 shall start. Once started the tower fan speed shall be varied by a variable frequency drive. A temperature sensor in the loop water supply line shall provide a signal to the VFD. Fan No.2 shall reach full speed at a water temperature of 90°F.
 7. When the loop supply water temperature drops below 68°F the first stage of boiler B-1 shall start. For each 1° drop below 68°F an additional stage of boiler B-1, B-2, B-3 or B-4 shall start. At 60°F all stages shall be energized.
 8. Sensors in the piping and differential pressure switches shall be provided as shown on the drawings. Input signals to the variable frequency drives shall be 0-10VDC.
 9. Boilers and variable frequency drives shall be connected to the building EMS through Modbus or BACnet communication interfaces.
 10. Cooling tower fill level shall be maintained by an electronic level control in the cooling power. The level control shall open a solenoid valve in the cold water make up line to fill the tower.
 11. Cooling tower high and low water level alarm switches in the cooling tower electronic level control shall provide inputs to the control module to indicate water level.
- C. Temperature control for each water source heat pump unit shall be as follows:
1. A control module shall be provided for each heat pump unit to control the fan, compressor and reversing valve. A wall mounted temperature sensor located in the space shall provide an analog input signal to the control module.
 2. Each heat pump unit shall be programmed to start and stop according to the day/night schedule provided by the owner.
 3. The unit fan shall run continuously in the day cycle or cycle with a call for heating or cooling as programmed by the owner.
 4. On a rise in space temperature above the cooling set point, the water valve shall open and an end switch in the valve shall start the compressor when the valve is completely open.
 5. On a drop in space temperature below the heating set point, the water valve shall open, an end switch in the valve shall start the compressor when the valve is completely open and the reversing valve shall be in the heating mode.
 6. In the night cycle the unit fan shall be off. On a drop in space temperature below the night setting of 55°F, the fan and the heat shall start.

7. A duct mounted temperature sensor located in the supply air duct shall provide an analog input signal to the control module to provide temperature indication only.
 8. A duct mounted smoke detector, furnished as part of the Fire Alarm system and installed in the supply air duct of each unit which supplies air to a corridor or which has a smoke damper in the duct system shall shut down the unit and close the smoke damper through an auxiliary contact in the smoke detector when smoke is present.
 9. On certain water source heat pump units as scheduled on the drawings, the water valves shall be omitted to provide minimum flow through the pump.
 10. Where an occupancy sensor is provided in the room under the Electrical Section, connect the control module controlling the unit to the auxiliary contact in the sensor (one N.O., one N.C. rated at 1 amp at 24 vac). When the space is determined to be unoccupied by the sensor, change the heating and cooling setpoints for the unit to the unoccupied setpoints.
 11. A malfunction relay in the WSHP unit and a malfunction relay in the Ionization device each have normally open contacts. Connect these contacts in parallel to send a signal to the EMS if either contact closes indicating trouble.
 12. A 24 volt ionization device shall be connected to the unit so that ionization device is activated whenever the unit fan runs.
- D. Temperature monitoring for ductless split system units, shall be as follows:
1. The unit shall run on its own built-in sensor and operating controls. A wall mounted temperature sensor located in the space shall provide an analog input signal to a control module for temperature monitoring only.
 2. The unit shall run continuously.
 3. The cut-off switch in the external condensate pump shall shut the unit down when the switch is closed.
- E. Electric Unit Heaters shall be controlled as follows:
1. Ceiling mounted and Ceiling suspended electric unit heaters shall be controlled by a control module. A wall mounted temperature sensor located in the space shall provide an analog signal to the module.
 2. Wall mounted heater shall be controlled by an integral thermostat furnished with the heater.

- F. Controls for exhaust fans shall be as follows:
1. Exhaust fans with control sequence IT shall be started by wall mounted interval Timers furnished under this section and installed under the Electrical Section.
 2. Exhaust fans with control sequence EMS shall be started and stopped by a control module. The fans shall start and stop according to a schedule provided by the Owner.
- G. Energy recovery units ERU shall be controlled as follows:
1. A control module and temperature, humidity and CO2 sensors shall be furnished by the control system manufacturer and factory installed in Energy Recovery Units by the unit manufacturer. See HVAC Section.
 2. Connect the EMS LAN to the ERU at the terminals provided on the unit.
 3. Duct mounted smoke detectors, installed in the supply air duct of the ERU shall shut down both fans in the unit and close all smoke dampers in the exhaust or supply duct system of that unit through an auxiliary contact in the smoke detector when smoke is present.
 4. Where noted on the drawings, a hazardous air sensor shall close the outside air damper and shut down the ERU in all units installed on this addition when sensor detects harmful chemicals.
- H. Solenoid operated trap primers shall be controlled as follows:
1. Trap primers with a solenoid actuator are located at p-traps above the ceiling at various locations throughout the building as shown on the drawings. The trap primers are furnished under the plumbing section of the specifications. The solenoid valves operate at 24 volts and draw 6.3 watts.
 2. Provide a control module to operate the trap primer solenoid valves on a schedule provided by the owner. Initially set the solenoid valves to open for 5 seconds once a day at 12:00 a.m.
 3. Provide a transformer and low voltage wiring to each solenoid valve. The size of the transformer and the length and size of the wiring shall be determined by the contractor as required to operate the solenoid valves.
- I. Domestic water heating system shall be controlled as follows:
1. Water heaters and hot water recirculating pumps at heaters shall be started and stopped according to a day/night schedule provided by the owner and by the demand control program.

2. A temperature sensor located in the hot water supply pipe of each water heater and in the hot water storage tank shall provide an analog input signal to the control module to provide temperature indication only.
- J. Alarms from the following systems shall be indicated on the EMS System:
1. Fire Alarm System - Activation by any initiating device.
 2. Fire Alarm - Loss of Power.
 3. Burglar Alarm - Activation by any Device
 4. Burglar Alarm - Loss of Power
 5. Carbon Monoxide Detector – 50ppm and 200 ppm.
 6. Standby Generator - Running - Modbus or BACnet.
 7. Standby Generator - Overcrank - Modbus or BACnet.
 8. Sewage Lift Station High Water Alarm
 9. Hazardous Air Sensor
- K. Lighting controls shall be as follows:
1. Outside lighting, normal lighting and emergency lighting shall be turned on and off by a control module which shall energize lighting contactors provided under the Electrical Section.
- L. Lighting Controls using motion detectors shall be as follows:
1. Motion sensors shall control lighting and hvac through relays
 2. Motion sensors shall be furnished and installed under this section of the specification.
 3. Relays shall be furnished under this section of the specifications and installed in the lighting circuits under the Electrical Section.
 4. The air conditioning shall be programmed so that when the motion sensor determines the room is unoccupied and the lights are off. The air conditioning shall be placed in the night setback or unoccupied mode. When a person enters a room the air conditioning shall return to the occupied mode.
 5. Control wiring from the motion sensor and from the relay to the control module for each HVAC unit shall be furnished and installed under this section of the specifications.

3.2 EXISTING CONTROLS

- A. The existing control system shall be removed as required to update for new equipment installed under this project.

PART 4 - ELECTRICAL

- 4.1 Motors and motor starters required for proper operation of equipment covered under this section, except items specified furnished under the Electrical Section, shall be furnished under HVAC Section. Devices which are a part of the power wiring circuit and which are not integral parts of the equipment, shall be installed under the Electrical division.
- 4.2 Controls, relays, contactors and switches required for proper operation of equipment covered under this section, except items specified furnished under the HVAC Section or the Electrical Section, shall be furnished under this section of the specifications.
- 4.3 All control and interlock wiring including 120 volt power to control devices shall be furnished and installed under this section.
- 4.4 Power wiring to equipment, unless otherwise indicated hereinbefore, shall be furnished and installed under the Electrical Division of the specifications. A 120 volt circuit is provided in the mechanical room and several electrical rooms for the control power. All other sources of 120 volt power shall be provided in this section.
- 4.5 Devices, materials and installation shall conform with requirements of the Electrical Division, except as specified herein.
- 4.6 Wall mounted sensors shall be installed 4'-0" above the finished floor.
- 4.7 All wiring shall be of adequate size for the service. The minimum size low voltage control wire for circuits operating at 50 volts or less shall be #18 AWG. The minimum size line voltage control wire shall be #14 AWG THHN, 600 volt insulation. All control wiring shall be protected against overload by fuses or circuit breakers as required by The National Electrical Code.
- 4.8 Conduit and junction boxes for room sensors and certain other control devices shall be furnished and installed under the Electrical Division and are shown on the Electrical drawings. All other conduit required for the control system which is not shown on the Electrical drawings shall be furnished and installed under this section of the specifications.
- 4.9 All wiring and cable installed exposed in a space, concealed inside a wall, concealed above a non-accessible ceiling or underground outside the building shall be installed in conduit. All line voltage wiring shall be installed in conduit. All low voltage wiring installed above accessible ceilings may be installed without conduit by using cable with a jacket which is U.L. listed for installation in a return air plenum.
- 4.10 Plenum rated cable installed in corridors shall be installed in cable hangers which are specified in Electrical Section. All cables for this system shall be grouped together within the hanger and tied with a cable tie. See detail on the drawings for arrangement with other systems.

- 4.11 Plenum rated cable installed in other spaces where there are no cable hangers shall be tied to the building structure at approximately 6'-0" on center using cable ties.
- 4.12 Plenum cable shall pass through walls by drilling a hole in the wall and installing a conduit with bushings on each end through the wall. Install the cable through the conduit and in fire or smoke rated walls, seal the opening around the conduit and the hole in the conduit with a U.L. listed fire rated sealant.
- 4.13 All plenum rated cable used for the control system shall have a white or clear outer jacket. All cable ties shall be plenum rated.

All wiring shall be color coded or identified with tab markers.

End of Section 155000

SECTION 161000 - ELECTRICAL

PART 1 - GENERAL

1.1 CODES

- A. Work covered by this section of the specifications shall conform to NFPA 70, the National Electrical Code, 2020 Edition with No Georgia State Amendments.

1.2 STANDARDS FOR MATERIALS

- A. All material shall be new and shall be listed by the Underwriters' Laboratories, Inc., as conforming to its standards in every case where such a standard has been established for the particular type of material in question or except as otherwise specified or implied herein.

1.3 SUBMITTALS

- A. Where equipment is specified herein or on drawings, by manufacturer's names or numbers, this shall denote minimum requirements as to quality, type, capacity, function, and performance. All equipment must have the Engineer's approval before ordering.
- B. Submittals shall be submitted in electronic *.pdf format. File name shall include the job name, specification section and date of the submittal. Submittals containing multiple items must include a table of contents with hyperlinks to the cover page for each item. The cover page for each piece of equipment shall itemize equipment features to show compliance with or deviation from the requirements contained in the specifications and drawings. If the supporting product data is more than ten (10) pages long, include hyperlinks on the item's cover page to the supporting information.

1.4 OPERATION AND MAINTENANCE INSTRUCTIONS

- A. The Contractor shall furnish operating and maintenance instructions for all equipment furnished and installed in pdf format as defined in General Conditions.
- B. Product data shall be grouped into logical groups and divided with hyperlinks to the cover page for each item.

1.5 TESTING

- A. Before any work is started, the Contractor shall test all existing electrical systems to which work is to be done, i.e., the Master Television System, Communications/Program System and Fire Alarm System to confirm that they are in good working order. Any defects shall be reported to the Gwinnett County Board of Education Maintenance Department before the Contractor begins any work. If no defects are reported, the systems shall be assumed to be in good working order.
- B. At the completion of the work, a thorough test shall be made in the presence of the Engineer or his representative, with all equipment, machinery, and appliances in operation and free from defects.
- C. The Contractor shall uncover all concealed areas and remove all panelboard covers during the inspection if requested.

1.6 EXCAVATION AND BACKFILL

- A. All excavation and backfill for work under this section shall be in accordance with Division 2, Site Work.
- B. Trenches shall be of sufficient width and depth to permit proper installation of the conduit. Backfilling shall be thoroughly compacted by placing loose earth in the trench in six inch layers and tamping in place. Backfill material shall not contain large rock, paving materials, sharply angular substances or corrosive materials.

1.7 UTILITY CONNECTIONS

- A. Connect to the existing utilities as indicated on the drawings.
- B. Determine from the Telephone Company and Power Company the exact location of the services. Advise the Engineer of any discrepancies before any work is done.
- C. Provide all service entrance equipment as required for a complete installation, all in accordance with the utility company's requirements.
- D. All charges for service entrance or metering equipment shall be included in the bid price.

1.8 ELECTRICAL SYSTEM CHARACTERISTICS

- A. Electrical system characteristics shall be as indicated on the drawings.

PART 2 - PRODUCTS

2.1 FIXTURE OUTLETS, CONDUIT JUNCTION BOXES

- A. Furnish and install all outlet boxes and junction boxes, as indicated on the drawings or as required. The approximate locations of the outlets are shown on the plans. The right is reserved to change the exact location of any switch, ceiling outlet, or other outlet in any area before it is permanently installed. Contractor shall specifically verify all door swings and install all lighting switches on the latch side of the door. Boxes for fixtures and devices shall be securely attached to the building structure, using wood screws for wood construction, expansion bolts for concrete, and bolts or galvanized clamps for steel construction. Boxes set in concrete or masonry shall be secured in place with cement mortar.
- B. Ceiling outlet boxes shall be code gauge galvanized steel and shall be 4" octagon boxes, 1-1/2" deep minimum, larger where required.
- C. Switch and receptacle outlet boxes concealed in walls shall be standard utility or gang boxes except that outlet boxes installed in tile or exposed masonry walls shall be square corner boxes. Sectional switch boxes shall not be used. Outlet boxes installed in concrete or concealed masonry shall be provided with 1" deep plaster cover. The box shall be positioned so that concrete or mortar shall fill around the plaster cover and the device plate can be installed flush with the finished surface. Single switches shall be installed in utility boxes without plaster covers.
- D. Switch and receptacle boxes exposed on walls shall be cast iron type with threaded hubs and sheet steel covers.
- E. Floor outlet boxes shall be adjustable formed steel concrete-tight class boxes with covers as specified on the drawings.
- F. Junction boxes and pull boxes installed outside and exposed to the weather or underground shall be constructed of polymer concrete reinforced with fiberglass with bolt on covers.
- G. Pull boxes shall be installed in conduits as needed so that pulls do not exceed 180 feet in length or 360° of bends.
- H. Locate all boxes so that covers are accessible and removable. Boxes shall be equipped with cover plates of the correct type and size for the box. All unused knockouts shall be plugged.

2.2 CONDUITS

- A. All wiring shall be installed in conduit unless otherwise specified herein. All conduit shall be U.L. listed.

- B. All conduit installed inside the building and above grade shall be galvanized steel electrical metallic tubing except where rigid or intermediate steel conduit is shown on the drawings or required by code or by other paragraphs in the specifications.
- C. No above grade conduit shall be installed in floor slabs above grade. Conduit shall be installed below the floor slab in the ceiling cavity of the floor below, or above the ceiling of the floor shown.
- D. All conduit installed exposed below 6'0" in a mechanical room, kitchen or in an area subject to damage shall be rigid or intermediate steel conduit with threaded connections.
- E. All conduit installed underground outside the building or in or under the building floor slab on grade shall be schedule 40 rigid PVC conduit except where indicated otherwise. Conduit shall be placed below the slab and vapor barrier and not within the slab. Vertical penetrations are allowed.
- F. Where PVC conduit turns up through the slab inside a wall, the PVC conduit shall extend up to the first junction box. Where PVC conduit turns up exposed, steel conduit shall begin at a point 2" below the slab.
- G. A green ground wire of the size required by Table 250-95 in the National Electrical Code shall be installed in every PVC conduit used for current carrying conductors.
- H. Conduit underground outside the building shall be installed a minimum of 24" below grade. All joints and connections shall be sealed water tight.
- I. Install warning tapes 12" above all underground conduit. Warning tapes shall be T&B/Westline NA-0608 (yellow) for electric lines, NA-0602 (orange) for telephone or cable TV lines and NA-0606 (red) for high voltage primary by power company or approved equal by Brady or Seton.
- J. Conduits shall be supported on not more than 8'0" centers when concealed and 5'0" centers when exposed. Conduits shall be supported by means of approved galvanized iron clamps or hangers, attached to masonry with inserts and bolts or lead expansion shields or to structural members by means of approved galvanized iron clamps or hangers. Where installed exposed, conduits shall be parallel with, or at right angles to walls or ceilings.
- K. Except where terminating in a threaded hub fitting, all conduits shall terminate in outlet boxes, junction boxes, pull boxes, cabinets, etc., with one locknut installed outside the box and one locknut and a bushing inside the box. The locknuts shall be tight to make both a mechanical and electrical connection. Bushings for all rigid conduit shall be insulating end bushing, and shall be grounding type where required.
- L. EMT coupling and box connectors shall be steel compression type with insulated throat, U.L. listed raintight and concrete tight. Connectors shall be as manufactured by Appleton, Efcor, O.Z., Raco, Steel City, or T&B.

- M. A polyolefin fish wire shall be pulled into each empty conduit.

2.3 FLEXIBLE CONDUIT

- A. Furnish and install flexible metal conduit connections to all motors and to all equipment subjected to vibration. Minimum size shall be 1/2". Length shall be approximately 15" minimum and shall not exceed 6'0" maximum.
- B. Nominal size 3/8" flexible metal conduit in lengths not exceeding 6'0" may be used for connecting individual lighting fixtures.
- C. Provide "Sealtight" conduit and Appleton, Ideal or T&B liquid-tight fittings at all flexible connections subject to weather or located in mechanical rooms or kitchen area.
- D. Install a green ground conductor in each piece of flexible conduit. The conductor shall be of the size required by the National Electrical Code.

2.4 CONDUCTORS FOR CONDUIT SYSTEMS

- A. Furnish and install all wire, cable and conductors required for the electrical installation. All conductors shall be copper except that the Contractor may substitute 8000 series aluminum conductors of the same ampacity for the service entrance conductors. Where this requires larger wire sizes, the conduit sizes shall also be increased as required by the code. All sizes shall be AWG. All conductors #10 and smaller shall be solid. Minimum size for power and lighting circuits shall be #12. Minimum size for low voltage (24 volts) control circuits shall be #18. Minimum size for 120 volt control circuits shall be #14. Minimum insulation rating on all conductors shall be 600 volts. Insulation shall be as follows, except as otherwise noted on the drawings:

Main Service Conductors	Type THHN/THWN or XHHN
Feeders	Type THHN/THWN
Branch Circuits	Type THHN/THWN

- B. Branch circuit conductors shall be color coded as follows:
 - 1. 208Y/120 Volt System: Phase A - black, Phase B - red, Phase C - blue, Neutral - white, Ground - green, Isolated ground - green with yellow stripe.
 - 2. 480Y/277 volt system: Phase A - brown, Phase B - Orange, Phase C - yellow, Neutral - gray, Ground - green, Isolated ground - green with yellow stripe.
- C. Feeder and service entrance conductors shall be color coded by the use of colored plastic tape applied within 6" of each conductor end or tap. Color coding conductor markers shall be Brady, Ideal or T&B Westline.
- D. Lubricants shall be used on all feeder cables and as otherwise required to facilitate the pulling of wires. Lubricants shall be specifically identified on the label as being wire or cable pulling lubricants.

- E. Corrosion inhibitors shall be used on all aluminum conductors.

2.5 TYPE MC CABLE

- A. Type MC cable may be used in place of EMT only for the following applications where the wiring is concealed inside the building, above a ceiling or concealed inside a wall:
 1. Vertical drops from overhead junction boxes down to light fixtures.
 2. Vertical drops from overhead junction boxes down to receptacles in walls and horizontally through stud walls.
 3. Vertical drops from overhead junction boxes down to motors or other equipment.
 4. As a substitute for flexible conduit in concealed spaces or exposed at mechanical equipment in dry locations.
- B. Type MC cable where allowed in paragraphs 1 through 4 above shall be installed in accordance with ARTICLE 334 of the National Electrical Code. Conductors shall be copper. Insulation shall be rated at 600 volts and 90°C.

2.6 WIRING CONNECTORS

- A. Splices, joints and taps in outlet boxes, pull boxes, or wiring troughs shall be made with wire nut electrical spring connectors for conductors #8 and smaller. Joints or taps in conductors larger than #8 shall be made with alloy set screw connectors or compression type connectors, each with 600 volt insulating covers.

2.7 WIRING TROUGHS

- A. Furnish and install all necessary wiring troughs at panels, starter or built-up control center locations, and where noted on the drawings. The troughs shall be of adequate length and size to contain all power wiring and control wiring.
- B. Wiring troughs shall be steel, code gauge, all seam welded, no knockouts, and with screw cover.

2.8 SUPPORTS

- A. Provide and install supports for all equipment and materials installed under these specifications. Supports shall be steel angle or channel or B-Line, Kindorf or Unistrut channel and fittings as approved. Minimum size rods shall be 3/8".

2.9 PANELBOARDS

- A. Furnish and install all panelboards as scheduled on the drawings. Panelboards shall be surface or flush mounted as indicated and shall have front trim with doors and latches. Panelboards shall have door-in-door front trim where front is hinged to box.
- B. Panelboards shall be U.L. labeled. Service entrance panelboards shall be U.L. labeled as being suitable for use as service entrance equipment.

- C. Panelboards shall have arc flash warning labels as required by NFPA 70E.
- D. Branch circuit breakers or switches shall be arranged in the panelboards as scheduled on the drawings and branch circuit conductors shall be connected to panelboards by branch circuit number as scheduled. A typewritten directory of circuit numbers shall be installed under clear plastic inside each panelboard door. Directories shall indicate the type of load served and the room number of the rooms served by the circuit. Spares shall be noted on directories in pencil.
- E. Panelboards shall be as manufactured by General Electric or approved equal by Eaton, Siemens or Square D-Schneider.

2.10 EXISTING PANELBOARDS

- A. Where indicated on the drawings, existing panelboards shall be reused. Rearrange existing circuit breakers and install new circuit breakers as required by the drawings. New branch circuit breakers shall be manufactured by the original panelboard manufacturer and shall have the same short circuit rating as the existing breakers.
- B. Branch circuit breakers or switches shall be arranged in the panelboards as scheduled on the drawings and branch circuit conductors shall be connected to panelboards by branch circuit number as scheduled. A typewritten directory of circuit numbers indicating new breakers and changes to existing breakers shall be installed under clear plastic inside each panelboard door. Directories shall indicate the type of load served and the room number of the rooms served by the circuit. Spares shall be noted on directories in pencil.

2.11 DRY TYPE TRANSFORMERS

- A. Furnish and install dry type, totally enclosed, self-cooling transformers as scheduled on the plans. Enclosures shall be ventilated on 30 kva and larger units.
- B. Transformers 30 kva and larger shall have 220°C temperature class insulation and shall be rated for a 150°C rise and a 40°C ambient unless otherwise indicated on the drawings.
- C. Transformers 150 kva and larger which are not located in fire rated electrical rooms shall have 150°C temperature class insulation and shall be rated for an 80°C rise and a 40°C ambient.
- D. Basic impulse level shall be 10 kv. Sound level shall not exceed NEMA standard sound levels of 45 dB up to 50 kva, 50 dB up to 150 kva and 55 dB up to 300 kva. Efficiency shall comply with DOE 2016 Standards.
- E. Transformers shall be as manufactured by General Electric or approved equal by Eaton, Siemens or Square D-Schneider.

2.12 CIRCUIT BREAKERS

- A. Furnish and install all individually mounted circuit breakers as indicated on the drawings. Circuit breakers shall have NEMA-1 enclosures, surface or flush mounted as indicated. Circuit breakers shall be as manufactured by General Electric or approved equal by Eaton, Siemens or Square D-Schneider.

2.13 SAFETY SWITCHES

- A. Furnish and install all fusible or non-fusible safety switches as indicated on drawings. Safety switches shall be general duty type with NEMA 1 enclosures when installed inside the building and NEMA 3R raintight enclosures when installed outside. Safety switches shall have the number of poles, wires and voltage rating for the load served and shall have ground lugs. Safety switches shall be as manufactured by General Electric or approved equal by Eaton, Siemens or Square D-Schneider.

2.14 FUSES

- A. Fuses in safety switches serving all motor branch circuits shall be Bussmann Fusetron, dual element, time delay, size and voltage as noted on the drawings.
- B. Install labels in all fused devices indicating proper size and type installed under this contract.
- C. Fuses shall be Bussmann as scheduled above or approved equal by Gould-Shawmut, Littelfuse or Cefco.

2.15 PHASE FAILURE RELAYS

- A. Phase failure relays shall be used to monitor lighting panels and turn on emergency lights if any phase fails. Phase failure relays shall be single pole NO-NC and shall be energized if any phase voltage varies more than +15/-20% of nominal voltage.
- B. Phase failure relays shall be General Electric type RSFF or approved equal by Eaton, Siemens or Square D-Schneider.

2.16 CONTACTORS (NORMALLY OPEN)

- A. Contactors shall be electrically operated, mechanically held type with the number of poles, voltage and ampere rating as indicated on the drawings. Contactors shall have Nema 1 enclosures. Provide accessories as indicated on the drawings.
- B. Contactors shall be as manufactured by Square D-Schneider or approved equal by Eaton, General Electric, Siemens or Asco.

2.17 CONTACTORS (NORMALLY CLOSED)

- A. Contactors shall be electrically operated, magnetically held, normally closed type with the number of poles, voltage and ampere rating as indicated on the drawings. Contactors shall have Nema 1 enclosures. Provide accessories as indicated on the drawings.
- B. Contactors shall be as manufactured by Square D-Schneider or approved equal by Eaton, General Electric or Siemens.

2.18 MOTOR STARTERS

- A. Install and connect all separately mounted motor starters and variable speed drives provided under other sections of the specifications.

2.19 MOTORS, EQUIPMENT, CONTROLS, AND CONTROL WIRING

- A. All fan motors, air conditioning units, heating units, etc. will be furnished and installed under other sections of these specifications.
- B. Provide power connections for all equipment furnished and installed under other sections of these specifications.
- C. Provide control wiring, conduit and junction boxes only where noted on the drawings.
- D. The installation, connection, and operation of controls not noted on the drawings will be done under other sections of the specifications, including the furnishing and installing of conduits, wiring, outlet boxes, control components and all connections.
- E. Control wiring shall be in accordance with the drawings and/or manufacturer's certified and approved wiring diagrams.
- F. Control wiring shall be marked with "E-Z" tape markers at all terminal points.

2.20 FIXTURES

- A. Furnish and install all fixtures as indicated on the drawings and scheduled. Fixtures shall be equipped with all hanging and mounting accessories required for complete installation. All fixtures recessed in plastered ceilings shall be provided with plaster frames.
- B. All fixtures recessed in acoustical tile ceilings shall be provided with the proper mounting flanges for installation in the type ceiling specified and shall be securely fastened to the ceiling framing member by U.L. listed clips.

- C. Install a minimum of two safety chains on each four foot section of lay-in type light fixture. Chains shall be #12 steel jack chain with a working load limit of 29 pounds. Chains shall be installed on opposite corner of fixture, shall connect to steel bar joist above and shall have enough slack that fixture is not supported by chain. Chains shall be furnished for all lay-in type fixtures.
- D. LED lamp drivers shall facilitate 0-10 volt dimming down to 10%.
- E. Where LED fixtures are specified, the manufacturer of substitute fixtures shall submit photometric room layouts showing the footcandle level produced by the fixture in each type room.
- F. LED lamps shall have a limited 10 year warranty. Lumen maintenance for LED lamps shall be L80/60,000 meaning the fixture shall produce 80% of the initial light output for 60,000 hours.

2.21 WIRING DEVICES AND RECEPTACLES

- A. Furnish and install all wiring devices and receptacles except as noted otherwise. Devices shall be as scheduled on the drawings, and shall be as manufactured by Arrow-Hart, Hubbell, Leviton or Pass & Seymour.

2.22 LIGHTING CONTROL DEVICES

- A. Occupancy sensors shall be dual technology type with both passive infrared and ultrasonic technologies. The sensor shall have swivel mounting bracket so it can be either ceiling or wall mounted. Ultrasonic transmission shall operate at 40 Khz. Time delays shall be either automatic or fixed at 5, 10, 15, 20 or 30 minute internals. The sensors shall be set in the automatic mode so that the required time delay and sensitivity are learned by the device over time. The sensor shall be aimed toward the teachers desk. Built in light level sensor shall work from 2 to 200 footcandles. The sensor shall contain an isolated relay with normally open and normally closed contacts rated at 1 ampere at 24 volts. Occupancy sensors shall be Hubbell, Leviton, SensorSwitch or Wattstopper.
- B. Power packs shall be a self contained transformer and relay contained in a UL2043 plenum rated housing and configured to mount onto a junction box with ½" knockouts. The secondary control voltage shall be 24 volts. Relay contacts shall be rated at 20 amperes at either 120 volts or 277 volts as indicated on the drawings. An auxiliary relay pack providing an additional relay contact shall be available as an accessory. Power packs shall be Hubbell, Leviton, SensorSwitch or Wattstopper.

- C. Daylight controllers shall be single zone variable voltage devices using a digital multi-band photosensor to dim lights automatically when sufficient natural daylight is present. The sensor shall have an on set point range of 1 to 850 footcandles. If the photosensor lighting drops below the ON setpoint light shall remain on. If the sensor's lighting level rises above the OFF setpoint the lights shall turn off. Daylight controllers shall be Hubbell, Leviton, SensorSwitch or Wattstopper.
- D. Lighting control devices shall be installed in accordance with the manufacturer's published installation instructions. A meeting at the jobsite with the manufacturer's representative shall be scheduled for review of the installation requirements before installation of the devices begins.

2.23 OUTLET AND DEVICE PLATES

- A. Furnish and install outlet and device plates on all junction boxes. Plates for concealed outlets shall be 0.032" satin finish stainless steel. Plates for exposed outlets shall be sheet steel suitable for outlet use. Finish on screws shall match finish on plate or cover. Furnish jumbo plates for all devices. Furnish blank covers on all unused outlets.

2.24 ENERGY MANAGEMENT SYSTEM

- A. A central computerized Energy Management System for the building will be furnished and installed under ATC&EMS Section.
- B. The Contractor shall provide contactors at lighting panels as indicated on the drawings.
- C. The Contractor shall install conduit and wiring as indicated on the drawings for connection of the Energy Management System to various electrical systems or equipment.

2.25 CABLE HANGERS

- A. Furnish and install cable hangers to support low voltage plenum rated cables for systems provided in other sections of the specifications.
- B. Cable hangers shall be installed in corridors above accessible ceilings at 3'-0" on center to the extent indicated on the drawings.
- C. Cable hangers shall be metal hangers of the size and configuration indicated on the drawings and as manufactured by Mono-Systems or approved equal by Atlas, B-Line or Southern Specialities. Install hangers to walls using bolts or screws and masonry anchors.

2.26 SURGE PROTECTIVE DEVICES

- A. Surge protective devices shall be of the type scheduled on the drawings and as manufactured by Current Technology. Surge protective devices shall have U.L. 1449 clamping levels not to exceed the values scheduled. Surge current ratings shall be as scheduled and all modes (L-N,L-L,L-G,N-G) shall be protected. The ANSI C62.41-1994 category C3 clamping levels shall not exceed 1250 volts (L-N) for 480Y/277V units or 900 volts (L-N) for 208Y/120V units. All ratings shall be with options and accessories noted in the schedule.
- B. Surge protective devices shall have a U.L. 1283 listed high frequency noise power filter with a minimum effective frequency range of 50KHz to 100MHz. Noise attenuation levels shall be greater than 30dB throughout the range, peaking at greater than 50dB.
- C. Approved equal surge protective devices as manufactured by Advanced Protection Technology, Eaton, EFI, General Electric, Innovative Technology, Intermatic, LEA, Liebert, Northern Technology, Siemens, Square D-Schneider, Surge Suppression of Georgia or Tycor are acceptable. Submittals shall include independent test values for all information in the schedule.

2.27 LABELING

- A. Provide bakelite laminated plastic labels on all panelboards. Lettering shall be 3/8" high. Labels shall be black with white core on 208Y/120V panels and red with white core on 480Y/277V panels.
- B. Junction box covers concealed above ceilings or exposed in mechanical or electrical rooms shall be labeled using black indelible marker to indicate which circuits are contained in the box. Do not label device plates in finished areas.

2.28 GROUNDING

- A. All wiring systems including conduit, panelboards, safety switches, lighting fixtures and wiring devices shall be grounded in accordance with Article 250 of the National Electrical Code.
- B. The neutral conductor shall be grounded at the supply side of the service disconnecting device by connecting the grounding conductor indicated on the drawings to the neutral inside the service disconnect device enclosure.
- C. All splices in grounding conductors shall be made with T&B compression connectors. All connections to equipment and boxes shall be made with T&B two bolt hole compression lugs. Connections to water pipes or ground rods shall be made with T&B heavy duty ground clamps. Approved equal devices by Burndy, Dossert, or Ideal are acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Tightening of switchgear components shall be performed with a calibrated torque tool as required by NEC Section 110.14 (D).

End of Section 161000

SECTION 161500 - FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 CODES

- A. Work covered by this section of the specifications shall conform to NFPA 70 and the National Electrical Code, 2020 Edition with No Georgia State Amendments and NFPA 72, the National Fire Alarm Code 2019 Edition with 2020 Georgia State Amendments.

1.2 STANDARDS FOR MATERIALS

- A. All material shall be new and shall be listed by the Underwriters' Laboratories, Inc., as conforming to its standards in every case where such a standard has been established for the particular type of material in question or except as otherwise specified or implied herein.

1.3 SUBMITTALS

- A. Where equipment is specified herein or on drawings, by manufacturer's names or numbers, this shall denote minimum requirements as to quality, type, capacity, function, and performance. All equipment must have the Engineer's approval before ordering.
- B. Shop drawings shall contain specification data sheets on each individual system component and wiring diagrams indicating all system components. Wiring diagrams shall show point to point wiring and the number and size of all conductors.
- C. Shop drawings shall be submitted to and approved by the Georgia State Fire Marshal before any work is started.
- D. Submittals shall be submitted in electronic *.pdf format. File name shall include the job name, specification section and date of the submittal. Submittals containing multiple items must include a table of contents with hyperlinks to the cover page for each item. The cover page for each piece of equipment shall itemize equipment features to show compliance with or deviation from the requirements contained in the specifications and drawings. If the supporting product data is more than ten (10) pages long, include hyperlinks on the item's cover page to the supporting information.

1.4 OPERATION AND MAINTENANCE INSTRUCTIONS

- A. The Contractor shall furnish operating and maintenance instructions for all equipment furnished and installed in pdf format as defined in General Conditions.
- B. All software, keys or tools required to program, install and maintain the system shall be turned over to the owner.

1.5 FIRE ALARM SYSTEM - SEQUENCE OF OPERATION

- A. Furnish and install an addressable, hard wired, supervised fire alarm system.
- B. The operation of any initiating device shall initiate the following:
 - 1. Cause a LCD to flash on the Fire Alarm Control Panel.
 - 2. Cause all alarms to sound and all visual alarms to flash.
 - 3. Release all magnetically held smoke doors.
 - 4. Provide a signal to the Intercom system for tone generation.
 - 5. Cause a LCD to flash on the remote annunciator panel.
 - 6. Duct detectors shall report supervisory in lieu alarm.
 - 7. Alarms in remote building shall not cause alarm in main building.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The fire alarm system shall be as manufactured by Edwards Systems Technology or approved equal by Fire-Lite or Notifier.

2.2 FIRE ALARM SYSTEM COMPONENTS

- A. Fire alarm control panel shall be an Edwards Systems Technology iO-1000 control panel and annunciator with the following features:
 - 1. An 80 character Alphanumeric liquid crystal display with two lines of characters shall provide information concerning point status (alarm, trouble, etc.), type of alarm (smoke detector, pull station, etc.), number of alarms in the system and a custom location label for each zone.
 - 2. Alarm, supervisory and trouble conditions shall have dedicated acknowledge pushbutton switches. Operation shall silence the tone alert with the LED remaining illuminated until the condition is restored to normal.
 - 3. Central microprocessor with EPROM for system program storage, non-volatile memory for building specific program storage and watch dog timer circuit to detect and report microprocessor failure.
 - 4. 1000 addressable points.
 - 5. Four onboard notification appliance circuits.
 - 6. Four auxiliary relays for connection to telephone dialer, EMS to indicate (Alarm) and (Loss of Power) and one spare.

7. Power supply and battery charger, 120 volt input, two outputs of 4 amps each @ 28.5 VDC and 25 AH battery.
 8. Red painted steel cabinet with locking glass front and recessed mounting trim.
 9. Programmable switch programmed and labeled as a drill switch.
 10. Lightning surge protection.
 11. The system shall operate on 120 volt, single phase power.
 12. Software shall be customized on site and shall provide a test function, two operator access levels, historical log and zone or point selectable alarm verification.
- B. Power extender panels shall have four general alarm circuits rated at 2 amps @ 24 VDC each. Provide as many power extender panels as required by the number of notification devices. At each panel install an annunciator module to provide a trouble signal.
- C. Remote annunciator shall have 80 character liquid crystal display, switches for acknowledgment, alarm silence and reset switch. Provide a separate switch which shall be programmed and labeled as a drill switch.
- D. Pull stations shall be addressable type with mechanical latch and manual reset.
- E. On each manual pull station provide a protective shield with horn and battery for flush mounted stations and also with spacer where stations are surface mounted.
- F. Combination alarm horn and strobe units shall be vibrating horn and strobe light. Alarm horns shall produce 80 decibels. Strobes shall be minimum 75 cd.
- G. On each audible and/or visual alarm unit in the gymnasium provide a wire guard.
- H. Visual only strobe light shall be minimum 75 cd.
- I. Magnetic door holders shall be Rixson 998 semi-flush, long latch wall mounted type. Mount holders 6' 0" AFF.
- J. Smoke Detectors shall be quick connect photo-electric detector heads with bases. Smoke detectors at elevator lobbies shall have relay sub-base.
- K. Duct mounted smoke detectors shall be mounted in duct housing with sampling tube mounted in the duct. Each detector shall have a SPDT 3 AMP, 120 volt relay contact for direct interlock with the unit served. Each detector shall have a remote indicator with a test switch mounted in the ceiling below the detector. Where duct detectors are mounted in ducts more than 12 feet above the floor the remote indicator and test switch shall be wall mounted at 7'0" aff.

- L. Duct detectors shown mounted outside shall be Air Products and Controls Inc model RT-3000 in weather tight NEMA 4x enclosure.
- M. Individual addressable modules shall be provided with surface mounted enclosures for water flow switches, rangehood fire protection systems, tamper switches, or elevator control to initiate fireman's emergency return.
- N. Water flow switch and tamper switch shall be furnished under Sprinkler Section and connected to the fire alarm system.
- O. Surge suppressors on 120 volt circuits shall be Ditek DTK-120 HW. Provide surge suppressors on the main fire alarm control panel and all extender panels on the 120 volt power. Surge suppressors shall be installed in their own enclosures. Where they are installed above ceiling mark the location with a green adhesive dot on the grid. Approved equal surge suppressors by G.E. or Square D-Schneider are acceptable.
- P. Surge suppressors on 24 volt circuits shall be Ditek DTK-2MLPL24B with DTK- MB10 base. 24 volt surge suppressors shall be installed on all data loops including on any circuit extended outside the building underground or overhead including wiring between buildings and to post indicator valves. Approved equal surge suppressors by G.E. or Square D-Schneider are acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The fire alarm system wiring shall be installed in accordance with the manufacturer's approved shop drawings and the requirements of the Electrical Section.
- B. The installation shall be supervised by a certified fire alarm technician with a Nicet, level 2 rating.
- C. All wiring shall be color-coded uniformly throughout.
- D. All wiring shall be installed in accordance with NFPA 70, NEC, Article 760, paragraphs A & C, Power-Limited Fire Protective Signaling Circuits.
- E. All above ground conductors shall be copper. Wire sizes and types shall be as indicated on the drawings. Terminations shall be made with crimp-on connectors.
- F. Underground wiring between buildings shall be fiber optic cable rated for underground use installed in conduit.

- G. All wiring and cable installed exposed in a space, concealed inside a wall, concealed above a non-accessible ceiling or underground outside the building shall be installed in conduit. All line voltage wiring shall be installed in conduit. All low voltage wiring installed above accessible ceilings may be installed without conduit by using cable with a jacket which is U.L. listed for installation in a return air plenum.
- H. Plenum rated cable installed in corridors shall be installed in cable hangers which are specified in Electrical Section. All cables for this system shall be grouped together within the hanger and tied with a cable tie. See detail on the drawings for arrangement with other systems.
- I. Plenum rated cable installed in other spaces where there are no cable hangers shall be tied to the building structure at approximately 6'-0" on center using cable ties.
- J. Plenum cable shall pass through walls by drilling a hole in the wall and installing a conduit with bushings on each end through the wall. Install the cable through the conduit and in fire or smoke rated walls seal the opening around the conduit and the hole in the conduit with a U.L. listed fire rated sealant.
- K. All plenum rated cable used for the Fire Alarm system shall have a red outer jacket. All cable ties shall be plenum rated.
- L. Smoke detector heads shall not be installed until the final test of the system and all dust creating construction has ceased in that area. Heads installed prematurely will be removed and cleaned according to manufacturer's instructions.

3.2 TESTING

- A. The manufacturer's authorized representative shall provide supervision of final system panel connections, perform a complete functional test of the system and submit a written report to the contractor attesting to the proper operation of the system.
- B. Perform all test necessary to meet the requirements of the local authorities having jurisdiction.
- C. Upon completion of the installation, the contractor shall provide to the architect a copy of the manufacturer's written report along with a signed written statement attesting that all system equipment was installed in accordance with these specifications and in accordance with wiring diagrams, instructions and directions provided to the contractor by the manufacturer.

3.3 LABELING

- A. Label each device (initiating, signaling or circuit) with its associated address inside the housing or on the connecting junction box.

- B. Each duct detector shall be labeled on the ceiling grid with white label with ¾" red letters e.g. M1-119 FA Duct Detector.
- C. Program the software to indicate the location or room number of each device.
- D. Programming shall give very clear direction of initiating device locations. e.g. "Duct Detector RTU-13 located outside room 1.191 above ceiling". RTU #'s shall match GCPS RTU # identifiers.
- E. Install a detailed label at the FACP listing all locations of Ditek Surge devices.
- F. Install a detailed label at the FACP listing all locations of power extender panels.
- G. Affix a P-touch label with white background and red letters to each pull station stating it's address within the FACP programming. e.g. M2-115.
- H. A 18" x 24" drawing of the building floor plan showing the location and address of all fire alarm devices shall be framed under glass and installed next to the Fire Alarm Control Panel, or remote annunciator located in the administration area.

3.4 INSTRUCTIONS

- A. Provide one "Instructions and Training Session" with the Owner's designated personnel. Give instructions on the capabilities, operation, trouble shooting, and routine maintenance of the fire alarm system. The instruction shall include equipment function descriptions, installation procedures, system start-up, system operation, system trouble shooting and any other information related to improving system reliability (i.e. eliminating interruptions to educational process and identifying contingency plans for major system malfunctions).
- B. Provide one "Instructions and Training Session" with the local authorities having jurisdiction as to the system's function and operation.

3.5 TRAINING

- A. The contractor shall provide, at no additional charge to the owner, a minimum of eight(8) hours of onsite instruction to familiarize up to six(6) Owner personnel with the capabilities, operation, trouble shooting, and routine maintenance of the fire alarm system. The instruction shall include equipment function descriptions, installation procedures, system start-up, system operation, system trouble shooting and any other information related to improving system reliability (i.e. eliminating interruptions to educational process and identifying contingency plans for major system malfunctions).
- B. The contractor shall provide a copy of the manufacturer's software program required to allow the owner to perform corrective work or update device changes.

- C. In addition to the above requirements, in the event that the company proprietary systems are installed (i.e. microprocessors, programmable logic boards, etc.), the Contractor shall provide, at no additional charge to the Owner, factory training for four(4) maintenance personnel to at least the intermediate level of competency. If the training is out of state, the Owner will pay all travel and living expenses. Training must be completed prior to Owner occupancy.

End of Section 161500

SECTION 270000 - COMMUNICATIONS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of General Requirements/Provisions shall be considered a part of this section and shall have the same force as if printed herein full. In addition, all information related to communications infrastructure that is documented in the architectural, structural, mechanical, and electrical drawings/documents shall be included as part of the Communications documents.

1.02 QUALITY ASSURANCE

- A. Specifications, Standards and Codes: All work shall be in accordance with the following:
1. The 2011 edition of the National Electrical Code (NFPA 70)
 2. American National Standards Institute (ANSI)
 3. National Electrical Manufacturers Association (NEMA)
 4. Telecommunications Industries Association (TIA)
 5. Electronic Industries Association (EIA)
 6. Institute of Electrical & Electronics Engineers (IEEE)
 7. Underwriters Laboratories (UL)
 8. American Standards Association (ASA)
 9. Federal Communications Commission (FCC)
 10. Occupational Safety and Health Administration (OSHA)
 11. American Society of Testing Material (ASTM)
 12. Americans with Disabilities Act (ADA)
 13. Local city and county ordinances governing electrical work
 14. In the event of conflicts, the more stringent provisions shall apply.

1.03 SCOPE

- A. The work to be done under this section of the Specifications shall include furnishing labor, material, equipment and tools required for the complete installation of the work indicated on the Drawings or as specified herein.
- B. All materials, obviously a part of the Communications Infrastructure and necessary to its proper operation, but not specifically mentioned or shown on the Drawings, shall be furnished and installed without additional charge.
- C. The Drawings and Specifications are complementary to each other and what is called for by one shall be as binding as if called for by both. If a discrepancy exists between the Drawing and Specifications, the higher cost shall be included, and the engineer shall be notified of the discrepancy.

1.04 WORK INCLUDED

The Communications Infrastructure installed and work performed under this Division of the Specifications shall include but not necessarily be limited to the following:

- A. Voice/Data Cabling Infrastructure
- B. Overhead Paging System
- C. Communications conduits, raceways, cable tray, racks, cabinets and equipment mounting boards
- D. Grounding and Bonding
- E. Underground raceway excavation, backfill, and compaction
- F. Concrete work for duct banks, maintenance holes, handholes, vaults and restoration (where applicable)

1.05 DEFINITIONS

- A. Terms: The following definitions of terms supplement those of the General Requirements and are applicable to Division 27 - Communications:
- B. Provide: As used herein shall mean “furnish, install and test (if applicable) complete.”
- C. Infrastructure: As used herein shall mean cable, conduit, raceway, cable tray or j-hooks with all required boxes, fittings, connectors, and accessories; completely installed.
- D. Work: As used herein shall be understood to mean the materials completely installed, including the labor involved.
- E. Owner: GCPS
- F. Project Manager: John Matthey and Byron Campbell
- G. Architect: CFMM
- H. Engineer: Spurlock

1.06 DRAWINGS

- A. Drawings are generally diagrammatic and show the arrangement and location of pathways, outlets, support structures and equipment. The Contractor shall carefully investigate the structural and finish conditions affecting his work and arrange his work accordingly. Should conditions on the job make it necessary to make adjustments to pathways or materials, the Contractor shall so advise the Engineer and secure approval before proceeding with such work.
- B. Where exact locations are required by equipment for stubbing-up and terminating conduit concealed in floor slabs, the Contractor shall request shop drawings, equipment location drawings, foundation drawings, and any other data required by him to locate the concealed conduit before the floor slab is poured.
- C. Materials, equipment or labor not indicated but which can be reasonably inferred to be necessary for a complete installation shall be provided. Drawings and Specifications do not undertake to indicate every item of material, equipment, or labor required to produce a complete and properly operating installation.
- D. The right is reserved to make reasonable changes in locations of equipment indicated on Drawings prior to rough-in without increase in contract cost.
- E. The Contractor shall not reduce the size or number of conduit runs indicated on the Drawings without the written approval of the Engineer.
- F. Any work installed contrary to Contract Drawings shall be subject to change as directed by the Engineer, and no extra compensation will be allowed for making these changes.
- G. The location of equipment, support structures, outlets, and similar devices shown on the Drawings are approximate only. Do not scale Drawings. Obtain layout dimensions for equipment from Architectural plans unless indicated on Communications plans.
- H. Schematic diagrams shown on the Drawings indicate the required functions only. The technology of a particular manufacturer may be used to accomplish the functions indicated without exact adherence to the schematic Drawings shown. Additional labor and materials required for such deviations shall be furnished at the Contractor's expense.
- I. Verify the ceiling type, ceiling suspension systems, and clearance above hung ceilings prior to ordering cabling and associated hardware. Notify the Engineer of any discrepancies.
- J. Review all architectural drawings for modular furniture.
- K. Portions of these Drawings and Specifications are abbreviated and may include incomplete sentences. Omissions of words or phrases such as "the Contractor shall," "shall be," "as indicated on the Drawings," "In accordance with," "a," "the" and "all are intended" shall be supplied by inference.

1.07 SUBMITTALS

- A. Submit for approval, details of all materials, equipment and systems to be furnished. Work shall not proceed without the Owner and/or the Project Manager's approval of the submitted items. Three (3) copies of the following shall be submitted:
 - 1. Submittals for individual systems and equipment assemblies that consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered, reviewed or stored, and such submittals will not be returned except at the request and expense of the Contractor.
 - 2. Contractor shall generate shop drawings. Modify reviewed and accepted shop drawings to include revisions based upon completion of work. Submit shop drawings with record drawings on hard copy.
 - 3. Shop drawings shall include equipment racks, patch panels, termination blocks, connection details, rack mounting details and any other details not included in the construction drawings.
- B. Any materials and equipment listed that are not in accordance with Specification requirements may be rejected.
- C. The approval of material, equipment, systems and shop drawings is a general approval subject to the Drawings, Specifications and verification of all measurements at the job. Approval does not relieve the Contractor from the responsibility of shop drawing errors. The Contractor shall carefully check and correct all shop drawings prior to submission for approval.

1.08 QUALITY ASSURANCE

- A. Equipment and materials required for installation under these Specifications shall be the current model and new (less than one [1] year from the date of manufacture), unused and without blemish or defect.
- B. Equipment shall bear labels attesting to Underwriters Laboratories, where subject to label service. Manufacturers of equipment and materials pertinent to these items shall have been engaged in the manufacture of said equipment a minimum of three (3) years and, if so directed by the Owner, be able to furnish proof of their ability by submitting affidavits and descriptive data about their product including size and magnitude comparable to requirements specified herein.

1.09 APPROVED CONTRACTORS

- A. LMI
- B. Metro Power
- C. Camp Electric/ACC
- D. Busker Communications Inc
- E. Customer 1st Communications
- F. Wachter
- G. No Exceptions

1.10 CONTRACTOR QUALIFICATIONS

- A. The Contractor shall have total responsibility for the coordination and installation of the work shown and described in the Drawings and Specifications. The Contractor shall be a Full Service Communications contractor specializing in the design, fabrication and installation of integrated communications systems and power distribution systems.
- B. Communications Systems specified shall be installed under the direction of a qualified Contractor, no subcontracting is allowed. All Contractors must be previously approved by GCPS prior to bid date. Qualification requirements shall include submittal by the Contractor to the Owner of the following:
 - 1. A completed AIA Document A305 Contractor's Qualifications Statement to be evaluated and approved by the Owner.
 - 2. List of previous projects of this scope, size and nature; including names and sizes of projects, description of work, time of completion and names of contact persons for reference.
 - 3. Shall certify that they are manufacturer-authorized for work to be performed.
- C. Contractor must work under the direction of a RCDD.
- D. The GCPS reserves the right to reject any and all applicants and to waive any irregularities in application responses. Applications which contain false or misleading statements or which provide information or reference that are not valid, will be rejected.

1.11 COORDINATION WITH OTHER TRADES

- A. The Contractor shall coordinate communications work with that of other sections as required to ensure that the entire communications work will be carried out in an orderly, complete and coordinated fashion.

1.12 SITE INVESTIGATION

- A. Prior to submitting bids of the project, visit the site of the work to become aware of existing conditions that may affect the cost of the project. Where work under this project requires extension, relocation, reconnections or modifications to existing equipment or systems, the existing equipment or systems, shall be restored to their original condition before the completion of this project.

1.13 PERMITS

- A. Obtain all permits and inspections for the installation of this work and pay all charges incident thereto. Deliver to the Owner all certificates of said inspection issued by authorities having jurisdiction.

1.14 RENOVATIONS AND ADDITIONS

- A. All work that would adversely affect the normal operation of the other portions of the Owner's property shall be done at a time other than normal working hours. Normal working hours shall be considered 8 a.m. to 5 p.m. Monday through Friday.
- B. Prior to submitting bids on the project, visit the site of the work to become aware of existing conditions that may affect the cost of the project.
- C. Where work under this project requires extension, relocation, reconnections or modifications to existing equipment or systems, the existing equipment or systems shall be restored to their original and operating condition. Remove all equipment indicated to be demolished, including outlets, devices, raceways and support structures.
- D. Care shall be exercised in the removal and storage of equipment indicated to be relocated or removed and reused. Prior to placing back into service, equipment shall be cleaned, and marred or chipped paint surfaces touched-up.
- E. Provide all coring, cutting and patching to existing walls, floors, etc., required for the removal of existing work or the installation of new work.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

- A. Product substitutions are not allowed unless noted as, "Or Approved Equal (by GCPS)." The Engineer's decision as to whether the submitted equipment is acceptable shall be final and binding.

- B. All changes necessary to accommodate the substituted equipment shall be made at the Contractor's expense, and shall be as approved by the Engineer. Detailed drawings indicating the required changes shall be submitted for approval at the time the substitution is requested.
- C. If substitutions are made in lieu of device specified; form, dimension, design and profile shall be submitted to the Engineer for approval.
- D. Submit request for approval of substitute materials in writing to the Owner at least ten days prior to bid opening.

2.02 MATERIALS

- A. All materials used in this work shall be new and shall bear the inspection label of Underwriters' Laboratories Inc. or certification by other recognized laboratory.
- B. The published standards and requirements of the Telecommunications Industries Association (TIA), National Electrical Manufacturers Association (NEMA), the American National Standard Institute (ANSI), the Institute of Electrical and Electronic Engineers (IEEE), and the American Society of Testing Materials (ASTM), are made a part of these Specifications and shall apply wherever applicable.
- C. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, for which replacement parts are available.
- D. When more than one unit of the same class of equipment or material is required, such units shall be the products of a single manufacturer or partner manufacturers that offer a certified solution.
- E. Components of an assembled unit need not be products of the same manufacturer, but must offer a certified end-to-end solution.
- F. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
- G. Components shall be compatible with each other and with the total assembly for the intended service.

PART 3 - EXECUTION

3.01 EXAMINATION OF CONDITIONS

- A. Prior to the start of work, the Contractor shall carefully inspect the installed work of other trades and verify that such work is complete to the point where installation may properly commence. Start of work indicates acceptance of conditions.

- B. Install equipment in accordance with applicable codes and regulations, the original design and the referenced standards.
- C. In the event of a discrepancy, immediately notify the Project Manager.
- D. Do not proceed with installation until unsatisfactory conditions and discrepancies have been fully resolved.

3.02 PROTECTION OF SYSTEMS AND EQUIPMENT

- A. Protect materials and equipment from damage during storage at the site and throughout the construction period. Equipment and materials shall be protected during shipment and storage against physical damage, dirt, theft, moisture, extreme temperature and rain.
- B. Damage from rain, dirt, sun and ground water shall be prevented by storing the equipment on elevated supports and covering the sides with securely fastened protective rigid or flexible waterproof coverings.
- C. During installation, equipment shall be protected against entry of foreign matter on the inside and be vacuum cleaned both inside and outside before testing, operating or painting.
- D. As determined by the Project Manager, damaged equipment shall be fully repaired or shall be removed and replaced with new equipment to fully comply with requirements of the Contract Documents. Decision of the Project Manager shall be final.
- E. Damaged paint on equipment and materials shall be repainted with painting equipment and finished with the same quality of paint and workmanship as used by the manufacturer.

3.03 ACCESS TO EQUIPMENT

- A. Equipment shall be installed in location and manner that will allow convenient access for maintenance and inspection.
- B. Working spaces shall be not less than specified in the National Electrical Code (NEC) for voltages specified.
- C. Where the Project Manager determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled, one time only, as directed by the Project Manager, at no additional cost to the Owner. "Conveniently accessible" is defined as being capable of being reached without the use of ladders or without climbing or crawling under or over obstacles such as motors, pumps, belt guards, transformers, piping and duct work.

3.04 CLEANING

- A. During construction, and prior to Owner acceptance of the building, remove from the premises and dispose of packing material and debris caused by communications work.
- B. Remove dust and debris from interiors and exteriors of electrical equipment. Clean accessible current carrying elements prior to being energized.

3.05 COMPLETION

- A. General: Upon completion of the work, remove excess debris, materials, equipment, apparatus, tools and similar items. Leave the premises clean, neat and orderly.
- B. Results Expected: Systems shall be complete and operational and controls shall be set and calibrated. Testing, start-up and cleaning work shall be complete.
- C. Maintenance Materials: Special tools for proper operation and maintenance of the equipment provided under this Specification shall be delivered to the Owner.

3.06 TESTING AND VERIFICATION

- A. See specific Division 27 sections for testing parameters of sub-systems.
- B. The Contractor shall verify that requirements of this Specification are met. Verification shall be through a combination of analyses, inspections, demonstrations and tests, as described below.
- C. Verification by inspection includes examination of items and comparison of pertinent characteristics against the qualitative or quantitative standard set forth in the Specifications. Inspection may require moving or partially disassembling the item to accomplish the verification, included as part of the work at no additional cost to the Owner.
- D. The Contractor shall verify by formal demonstrations or tests that the requirements of this Specification have been met. The Contractor shall demonstrate that the communications systems, components and subsystems meet Specification requirements in the “as-installed” operating environment during the “System Operation Test.” Even though no formal environmental testing is required, the Contractor shall measure and record temperature, humidity and other environmental parameters and the environmental conditions, which were encountered during the “System Operation Test.”
- E. The Contractor shall carefully plan and coordinate the final acceptance tests so that tests can be satisfactorily completed. The Contractor shall provide necessary instruments, labor and materials required for tests, including the equipment manufacturer's technical representative and qualified technicians in sufficient numbers to perform the tests within a reasonable time period.

- F. The Contractor shall satisfy all items detailed in the final acceptance check-off list (punch list). The list shall be a complete representation of specified installation requirements. At the time of final acceptance punch list items shall be corrected until the system is found to be acceptable to the Owner and the Project Manager.

- G. After the Contractor systems have been installed and tested, the completed test plan shall be signed by the Communications Contractor Project Manager and submitted for approval.

END OF SECTION 270000

SECTION 270510 - FIRESTOPPING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Firestopping for Communications Systems.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this Specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Firestopping Manufacturer(s)
 - 1. Flamestopper Thru-Wall Fitting - Wiremold Company (Firestop Devices)
 - 2. Unique Firestop Products (Firestop Devices)
 - 3. STI Firestop Products (Firestop Devices, Putties, Caulks, Sealants, etc.)
 - 4. Hilti (Putties, Caulks, Sealants, etc.)

2.02 TYPES OF PRODUCTS

- A. Sealants
 - 1. Intumescent Firestop Sealants and Caulks
 - 2. Latex Firestop Sealant
 - 3. Acrylic Water-Based Sealant

4. Silicone Firestop Sealants and Caulks
5. Firestop Putty
6. Firestop Collars
7. Wrap Strips
8. 2-Part Silicone Firestop Foam
9. Firestop Mortar
10. Firestop Pillows
11. Elastomeric Spray
12. Accessories:
13. Forming/Damming Materials: Mineral fiberboard or other type as per manufacturer recommendation

B. Firestop Devices

1. Thru-Wall Fitting (Flamestopper by Wiremold)
 - a. The firestop device box shall be constructed of 16 gage G90 steel.
 - b. The firestop device intumescent block shall be constructed of a graphite base material with expansion starting at 375°F and an unrestrained expansion between 6 to 12 times. The intumescent block shall be held securely by the box in order to prevent tampering and damage during installation.
 - c. The firestop device shall have doors which can be adjusted to prevent materials from penetrating the device if the device is empty or completely full. The doors shall be constructed of 16 gage G90 steel with No. 10-32 screws use to adjust opening size.
 - d. The firestop device shall be available for 2" and 4" trade size EMT conduit.
 - e. The firestop device shall be available in safety yellow powder coat, custom colors and an unpainted galvanized finish.
2. Threaded Firestop Device (Unique Firestop Products)
 - a. Threaded steel sleeve device incorporating flat washers secured by threaded device shall be installed around cables. The device shall be available in 1, 2 and 4-inch sizes. Maximum diameter of the wall penetration for 1, 2 and 4-inch sizes shall be 1-1/4, 2-7/16 and 4-1/2 inches respectively.
3. Smooth Firestop Device (Unique Firestop Products)
 - a. Smooth steel sleeve device incorporating flat washers secured by sliding compression couplers. The device shall be available in 1, 2 and 4-inch sizes. Maximum diameter of the wall penetration for 1, 2 and 4-inch sizes shall be 1-1/4, 2-7/16 and 4-1/2 inches respectively.
4. Split-Sleeve Firestop Device (Unique Firestop Products)
 - a. Threaded steel sleeve halves incorporating split couplings and slotted washers to fit the specific diameter of the opening. The device shall be available in 1, 2 and 4-inch sizes. Maximum diameter of the wall penetration for 1, 2 and 4-inch sizes shall be 1-1/4, 2-7/16 and 4-1/2 inches respectively.

5. Fire Rated Cable Pathway (STI EZ-PATH)
 - a. Fire rated cable pathway device modules shall be comprised of steel raceway with intumescent foam pads allowing 0-100 percent cable fill.

2.03 UL CLASSIFICATION

- A. Thru-Wall Fitting - The firestop device for use in through-penetration firestop systems shall have been examined and tested by Underwriters Laboratories Inc. to UL1479 (ASTM E 814) and bear the U.S. and Canadian UL Classification Mark.
- B. Threaded, Smooth and Split-Sleeve Firestop Devices - Firestopping sealants and devices shall be used together as a firestop system. All firestop systems shall bear a UL Classification system number. UL Classification system numbers are as follows:
 1. Threaded Firestop System
 - a. Block Wall - W-J-3049
 - b. Dry Wall - W-L-3138
 2. Threaded Firestop System (Vertical)
 - a. Slab - F-A-3010
 3. Smooth Firestop System
 - a. Block Wall - W-J-3048
 - b. Dry Wall - W-L-3137
 4. Split-Sleeve Firestop System
 - a. Block Wall - W-J-3047
 - b. Dry Wall - W-L-3136

2.04 FIRESTOPPING SYSTEMS

- A. Thru-Wall Fitting Firestop System:
 1. The device shall be classified for use in one-, two-, three, and four-hour rated gypsum, concrete and block walls and provide a maximum L rating of six cfm. The devices shall also been tested by Underwriters Laboratories Inc. to UL2043 and determined to be suitable for use in air handling spaces.
- B. Threaded, Smooth and Split-Sleeve Firestop Systems:
 1. Shall conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire tests in a configuration that is representative of field conditions.
 2. The F rating must be a minimum of one (1) hour but not less than the fire resistance rating of the assembly being penetrated. T rating when required by code authority shall be based on measurement of the temperature rise on penetrating item(s). The fire test shall be conducted with a minimum positive pressure differential of 0.01 inches of water column.
 3. For joints, must be tested to UL 2079 with movement capabilities equal to those of the anticipated conditions.

- C. Firestopping materials and systems must be capable of closing or filling through-openings created by 1) the burning or melting of combustible pipes, cable jacketing, or pipe insulation materials, or 2) deflection of sheet metal due to thermal expansion (electrical & mechanical duct work).
- D. Firestopping material shall be asbestos and lead free and shall not incorporate nor require the use of hazardous solvents.
- E. Firestopping sealants must be flexible, allowing for normal pipe movement.
- F. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces.
- G. Firestopping materials shall be moisture resistant, and may not dissolve in water after curing.

PART 3 - EXECUTION

3.01 CONDITIONS REQUIRING FIRESTOPPING

- A. General
 - 1. Provide firestopping for conditions specified whether or not firestopping is indicated, and if indicated, whether such material is designed as insulation, safing, or otherwise.
- B. Through-Penetrations
 - 1. Firestopping shall be installed in all open penetrations and in the annular space in all penetrations in any bearing or non-bearing fire-rated barrier.
- C. Membrane-Penetrations
 - 1. Where required by code, all membrane-penetrations in rated walls shall be protected with firestopping products that meet the requirements of third party time/temperature testing.
- D. Construction Joints/Gaps
 - 1. Firestopping shall be provided between the edges of floor slabs and exterior walls, between the tops of walls and the underside of floors, in the control joint in masonry walls and floors and in expansion joints.

E. Smoke-Stopping

1. As required by the other sections, smoke-stops shall be provided for through-penetrations, membrane-penetrations, and construction gaps with a material approved and tested for such application.

3.02 EXAMINATION

- A. Examine the areas and conditions where firestops are to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Verify that environmental conditions are safe and suitable for installation of firestop products.
- C. Verify that all pipes, conduit, cable, and other items that penetrate fire-rated construction have been permanently installed prior to installation of firestops.

3.03 INSTALLATION

A. General

1. Installation of firestops shall be performed by an applicator/installer qualified and trained by the manufacturer. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.
2. Apply firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, and manufacturer's recommendations.
3. Unless specified and approved, all insulation used in conjunction with through-penetrants shall remain intact and undamaged and may not be removed.
4. Seal holes and penetrations to ensure an effective smoke seal.
5. In areas of high traffic, protect firestopping materials from damage. If the opening is large, install firestopping materials capable of supporting the weight of a human.
6. Insulation types specified in other sections shall not be installed in lieu of firestopping material specified herein.
7. All combustible penetrants (e.g. non-metallic pipes or insulated metallic pipes) shall be firestopped using products and systems tested in a configuration representative of the field condition.

B. Dam Construction

1. When required to properly contain firestopping materials within openings, damming or packing materials may be utilized. Combustible damming material must be removed after appropriate curing. Noncombustible damming materials may be left as a permanent component of the firestop system.

3.04 FIELD QUALITY CONTROL

- A. Prepare and install firestopping systems in accordance with manufacturer's printed instructions and recommendations.
- B. Follow safety procedures recommended in the Material Safety Data Sheets.
- C. Finish surfaces of firestopping that are to remain exposed in the completed work to a uniform and level condition.
- D. All areas of work must be accessible until inspection by the applicable Code Authorities.
- E. Correct unacceptable firestops and provide additional inspection to verify compliance with this Specification.

3.05 CLEANING

- A. Remove spilled and excess materials adjacent to firestopping without damaging adjacent surfaces.
- B. Leave finished work in a neat and clean condition with no evidence of spill-overs or damage to adjacent surfaces.

3.06 IDENTIFICATION

- A. Refer to Section 27 05 53 - Identification for Communications Systems for labeling details.

END OF SECTION 270510

SECTION 270526 - GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Grounding and Bonding for Communications Systems.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this Specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Equipment Grounding Conductor Manufacturer(s)
 - 1. Southwire
 - 2. Or Approved Equal (by GCPS)
- B. Approved Grounding Lug Manufacturer(s)
 - 1. Burndy
 - 2. Thomas & Betts
 - 3. Or Approved Equal (by GCPS)
- C. Approved Grounding Busbar Manufacturer(s)
 - 1. Chatsworth Products, Inc.

2. B-Line
3. Harger
4. Or Approved Equal (by GCPS)

2.02 GROUNDING CONDUCTORS

A. Grounding Conductor

1. Construction shall be Type THHN copper conductors, insulated with heat and moisture resistant PVC over which a UL listed jacket is applied.
2. Jacket color shall be green or black. Black jacketed cable shall be identified at each termination point with a wrap of green tape.

2.03 GROUNDING LUGS

A. Grounding Lugs and Hardware

1. Grounding lugs shall be 2-hole and installed with a crimper that when properly executed the die of the crimper impresses the die # on the lug base. All lugs shall be sleeved with clear heat-shrink to allow for inspection of the crimp. Silicon bronze or stainless steel bolts and washers shall be used to install lugs to equipment. Exothermic welding is also allowed.

2.04 GROUNDING BUSBARS

A. Grounding Busbar

1. The grounding busbar shall be made of 1/4" thick solid copper.
2. The grounding busbar shall be installed with minimum clearance, 1" offsets and 1-1/2" insulators.
3. The grounding busbar shall accommodate 2-hole compression lugs.
4. The grounding busbar shall meet or exceed ANSI/TIA-607-B requirements.

PART 3 - EXECUTION

3.01 GROUNDING

- A. The facility shall be equipped with a Communications Bonding Backbone (TBB). This backbone shall be used to ground all communications cable shields, equipment, racks, cabinets, raceways, and other associated hardware that has the potential to act as a current carrying conductor. The TBB shall be installed independent of the building's electrical and building ground and shall be designed in accordance with the recommendations contained in the ANSI/TIA-607-B Telecommunications Bonding and Ground Standard.

- B. The main entrance facility/equipment room in each building shall be equipped with a telecommunications main grounding busbar (TMGB). Each telecommunications room (TR) shall be provided with a telecommunications ground busbar (TGB). The TMGB shall be connected to the building electrical entrance grounding facility.
- C. All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. entering or residing in the MC/IC/TC shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression lugs.
- D. All wires used for communications grounding purposes shall be identified with a green insulation. Non-insulated wires shall be identified at each termination point with a wrap or green tape. All cables and busbars shall be identified and labeled in accordance with the ANSI/TIA-606-A.
- E. See Section 27 05 43 - Underground Ducts and Raceways for Communications Systems for underground duct and raceway systems ground requirements.

3.02 IDENTIFICATION

- A. Refer to Section 27 05 53 - Identification for Communications Systems for labeling details.

END OF SECTION 270526

SECTION 270528 - PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Pathways for Communications Systems.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Rigid/Intermediate Conduit Manufacturer(s)
 - 1. Allied
 - 2. Triangle
 - 3. Wheatland
 - 4. Youngstown
 - 5. Or Approved Equal (by GCPS)
- B. Non-Metallic (PVC) Manufacturer(s)
 - 1. Carlon
 - 2. Georgia Pipe Company
 - 3. Or Approved Equal (by GCPS)

- C. Electrical Metallic Tubing (EMT) Manufacturer(s)
 - 1. Allied
 - 2. Triangle
 - 3. Wheatland
 - 4. Youngstown
 - 5. Or Approved Equal (by GCPS)

- D. EMT Fittings Manufacturer(s)
 - 1. Thomas & Betts
 - 2. Steel City
 - 3. Or Approved Equal (by GCPS)

- E. Innerduct/Inner-Conduit Channel Manufacturer(s)
 - 1. Carlon
 - 2. Endot Industries
 - 3. MaxCell
 - 4. Petroflex
 - 5. Eastern
 - 6. Or Approved Equal (by GCPS)

- F. Metallic Communications Outlet Box Manufacturer(s)
 - 1. Steel City
 - 2. Raco
 - 3. Or Approved Equal (by GCPS)

- G. Pull Box Manufacturer(s)
 - 1. Hoffman
 - 2. OZ Gedney
 - 3. Or Approved Equal (by GCPS)

- H. Approved Cable Tray System Manufacturer(s)
 - 1. B-Line Flex Tray
 - 2. Wiremold
 - 3. Legrand – Cablofill Wire Mesh
 - 4. Mono Systems, Inc.
 - 5. Snake Tray

- I. Approved Cable Hanger Manufacturer(s)
 - 1. Erico Products – Caddy
 - 2. B-Line
 - 3. Atlas
 - 4. Panduit
 - 5. Southern Specialties
 - 6. Or Approved Equal (by GCPS)

- J. Approved Tie Wrap/Velcro Strap Manufacturer(s)
 - 1. Leviton
 - 2. Panduit
 - 3. Or Approved Equal (by GCPS)

- K. Approved Surface Mounted Raceway Manufacturer(s)
 - 1. Wiremold ALA3800 and ALA4800. Refer to Drawings.
 - 2. Connectrac Under-Carpet Flex solution. Refer to Drawings.
 - 3. Thread power track by Steelcase. Refer to Drawings.

2.02 CONDUIT

- A. Rigid and Intermediate Conduit
 - 1. Rigid conduit, intermediate conduit, couplings, locknuts, bushings, elbows and connectors shall be standard thread. All materials shall be steel. Set screw or non-threaded fittings are not permitted.

- B. Non-Metallic (PVC) Conduit
 - 1. Non-metallic conduit shall be heavy wall, Schedule 40 PVC.
 - 2. Couplings and connectors for non-metallic conduit shall be of the same material and be the product of the same manufacturer of the conduit furnished.

- C. Electrical Metallic Tubing (EMT)
 - 1. Electrical metallic tubing (EMT), couplings and connectors shall be steel. Malleable iron, pressure-cast or die-cast fittings are not permitted.
 - 2. Fittings for 2" EMT and smaller shall be steel set screw type, except where otherwise noted. Fittings for 2.5" and larger shall be steel set screw type with two (2) screws for connectors and four (4) screws for couplings. All connectors shall be insulated throat type.

D. Conduit Support

1. Individual conduit hangers shall be galvanized spring steel specifically designed for the purpose and sized appropriately for the conduit type and diameter. Support individual conduits 1-1/2 inch and smaller with 1/4 inch threaded steel rods and use 3/8 inch rods for 2 inch and larger.
2. Conduit support channels shall be 14 gauge galvanized (or equivalent treatment) channel sized for the amount of conduit to be supported. Channel suspension shall be 3/8" threaded steel rods. Attach suspension rods to structure with swivel type connectors. Conduit straps shall be spring steel type compatible with channel.
3. Conduit straps shall be single hole cast metal type or two hole galvanized metal type. Conduit clamps shall be spring steel type for use with exposed structural steel.

E. Innerduct/Inner-Conduit Channel

1. Innerduct shall be corrugated plastic equipped with pull-string or mule tape.
2. Inner-conduit channel (MaxCell) shall be 3-channel with each channel equipped with mule tape.
3. See Drawings for innerduct / inner-conduit channel (MaxCell) details.

2.03 METALLIC COMMUNICATIONS OUTLET BOXES

- A. Metallic outlet boxes and device covers shall be galvanized steel not less than 1/16" thick.
- B. The dimensions of the metallic outlet box shall be 4" x 4" square with a minimum depth of 2-1/8".
- C. Metallic outlet boxes shall be equipped with single device covers (or two-device covers where needed). Where installed in plaster, gypsum board, etc., covers shall be raised to compensate for the thickness of the wall finish.
- D. Where metallic outlet boxes are to be empty for future use, blank coverplates shall be used.

2.04 PULL BOXES

- A. Pull boxes shall be constructed of galvanized steel with flat, removable covers fastened with plated steel screws.
- B. Pull boxes shall be equipped with keyhole screw slots in the cover to permit removal of the cover without extracting the screws.
- C. Pull boxes shall have provisions for grounding.

2.05 CABLE TRAY

A. Cable Tray System

1. Cable tray shall be steel or aluminum construction.
2. Cable tray cross members shall be factory welded at 12" intervals maximum.
3. Cable tray shall be equipped with one (1) or two (2) support rails that run the length of each segment.
4. End caps shall be installed on the exposed ends of the cable tray, channel supports and bolts. Protective covers shall be installed on threaded rods that come in contact with cabling plant.
5. Wall mount cable tray used in limited clearance areas shall be hook style and constructed of aluminum.
6. See Drawings for cable tray dimensions.
 - a. Cable Tray color shall be black or clear.

2.06 CABLE HANGERS

A. J-Hooks

1. J-hooks shall provide a bearing surface of sufficient width to comply with required bend radii of high-performance cables. J-hook shall be cULus Listed.
2. J-hooks shall have flared edges to prevent damage while installing cables.
3. J-hooks sized 1 5/16" and larger shall have a cable retainer strap to provide containment of cables within the hanger. The cable retainer strap shall be removable and reusable and be suitable for use in air handling spaces.

B. Adjustable Non-Continuous Cable Support Sling

1. Constructed from steel and woven laminate; sling length can be adjusted to hold up to 425 4-pair balanced twisted pair cables; rated for indoor use in non-corrosive environments. Rated to support Category 5 and higher cable, or optical fiber cable. Cable support sling shall be cULus Listed.
2. Adjustable non-continuous cable support sling shall have a static load limit of 100 lbs.
3. Adjustable non-continuous cable support sling shall be suitable for use in air handling spaces.

2.07 TIE WRAPS AND VELCRO STRAPS

A. Tie Wraps and Velcro Straps

1. Cables shall be fastened to support structures with tie wraps/Velcro straps.
2. Tie wraps/Velcro straps installed in air handling spaces must be plenum rated.
 - a. Non-plenum Tie Wrap color shall be black.
 - b. Plenum Tie Wrap color shall be red.
 - c. Non-plenum Velcro strap color shall be black.

- d. Plenum Velcro strap color shall be red.

2.08 SURFACE MOUNTED RACEWAY

A. Surface Mounted Raceway

1. Coordinate with Division 26 (Electrical Contractor). Refer to Drawings.

PART 3 - EXECUTION

3.01 PENETRATIONS

- A. Holes through concrete and masonry in new and existing structures shall be cut with a diamond core drill or concrete saw upon approval of the structural engineer of record for the base of building. Pneumatic hammer, impact electric, hand or manual hammer type drills shall not be allowed, except where permitted by the Project Manager as required by limited working space. X-ray all floor penetrations accordingly.
- B. Holes shall be located so as not to affect structural sections such as ribs or beams.
- C. Holes shall be laid out in advance. The Project Manager shall be advised prior to drilling through structural sections, for determination of proper layout.
- D. Structural Penetrations: Where conduits, wireways and other raceways pass through fire partitions, fire walls or walls and floors provide a code compliant effective barrier against the spread of fire, smoke and gases.
- E. All penetrations where conduit is not used shall be sleeved.
- F. No gaps or rough edges shall be allowed between wall and conduit/sleeve.

3.02 CONDUIT SYSTEM

- A. Conceal all conduits, except in unfinished spaces such as equipment rooms or as indicated by symbol on the Drawings.
- B. Leave all empty conduits with a 200 pound test nylon cord pull line.
- C. Flattened, dented, or deformed conduits are not permitted and shall be removed and replaced.
- D. Fasten conduit support device to structure with wood screws on wood, toggle bolts on hollow masonry, anchors as specified on solid masonry or concrete, and machine bolts, clamps, or spring steel clips, on steel.

- E. Install conduit with wiring, including homeruns as indicated on the Drawings. Any change resulting in a savings in labor or materials is to be made only in accordance with a contract change. Deviations shall be made only where necessary to avoid interferences and when approved by Engineer by written authorization.
- F. Conduit shall be run parallel or at right angles to existing walls, ceilings, and structural members.
- G. Attach backbone conduits larger than one-inch trade diameter to or from structure on intervals not exceeding twelve feet with conduit beam clamps, one-hole conduit straps or trapeze type support.
- H. Where conduits must pass through structural members obtain approval of Architect or Engineer.
- I. Install all conduits or sleeves penetrating or routed within rated firewalls or fire floors to maintain fire rating of wall or floor. Conduit shall not be installed in rated floors or walls if it compromises or violates the fire rating of floor or wall. Refer to architectural documents.
- J. Provide expansion and deflection coupling where conduit passes over a building expansion joint.
- K. Service entrance conduits and feeder conduits in direct contact with earth shall be schedule 40, heavy wall PVC. All service entrance conduit elbows shall be galvanized rigid steel. Service entrance conduits installed exposed or concealed in walls or above ceilings shall be galvanized rigid steel (G.R.S.) or intermediate metal conduit (IMC). Provide concrete encasement where required or as indicated on Drawings.
- L. All other conduit, unless specified herein, shall be electrical metallic tubing (EMT). PVC conduit is not allowed in exposed or concealed areas, but only within concrete.
- M. Conduit Installations Within Slab/Floor
 - 1. Conduit shall be run following the most direct route between points.
 - 2. Conduit shall not be installed in concrete where the outside diameter is larger than 1/3 of the slab thickness.
 - 3. Conduits shall not be installed within shear walls unless specifically indicated on the Drawings. Conduit shall not be run directly below and parallel with load bearing walls.
 - 4. Protect each metallic conduit installed in concrete slab or conduits 1-1/2 inch and smaller passing through a concrete slab against corrosion where conduit enters and leaves concrete by wrapping conduit with vinyl all-weather electrical tape.
 - 5. Protect all conduits entering and leaving concrete floor slabs from physical damage during construction.
 - 6. Provide expansion fittings in all conduits where length or run exceeds 200 feet or where conduits pass through building expansion joints.

7. Install all conduits penetrating or routed within rated fire floors to maintain the fire rating of the floor. Conduit shall not be installed in rated floors or walls if it compromises or violates the fire rating of floor or wall. Refer to architectural documents.
 8. Conduits installed within concrete floor slabs which are in direct contact with grade or which penetrate the building roof shall be galvanized rigid steel (G.R.S.), intermediate metal conduit (I.M.C.) or Schedule 40, heavy wall PVC.
- N. Communications cables shall not occupy conduits with power cables.
- O. Metallic conduits shall be grounded in accordance with ANSI/TIA-607-B.
- P. Conduit runs shall not have more than two (2) 90-degree bends between pull points.
- Q. Communications conduit system shall contain no condulets (also know as an LB).
- A. Rigid metal conduit (RMC) or intermediate metal conduit (IMC) shall be used for entrance conduits that exceed 50 feet into the building.
- B. Horizontal Conduits
1. Support horizontal conduits at intervals not exceeding ten feet and within three feet of each outlet, junction box, backboard, enclosure or cabinet. Support conduits from structural steel members with spring steel type or beam conduit clamps and to non-metallic structural members with one-hole conduit straps. For exposed conduits and where conduits must be suspended below structure, single conduit runs shall be supported from structure by hanger rod and conduit clamp assembly, and multiple conduits shall be supported by trapeze type support suspended from structure. Do not attach conduits to ceiling suspension system channels or suspension wires.
 2. For runs that total more than 100 feet in length, insert pull boxes so that no segment between boxes exceeds the 100 feet limit.
 3. Each horizontal home-run conduit can serve from one (1) to three (3) outlet boxes. For one (1) outlet box, a 3/4" conduit shall be used, minimum. For two (2) outlet boxes, a 1" conduit shall be used, minimum. For three (3) outlet boxes, a 1-1/4" conduit shall be used, minimum.

3.03 COMMUNICATIONS OUTLET BOXES

- A. Exact locations of the outlet boxes shall be coordinated with the electrical contractor and other trades.
- B. Non-metallic communications outlet boxes may only be used for wood frame construction and/or where code allows.

- C. The approximate locations of the outlets are indicated on the Drawings. The exact locations of outlets shall be determined at the building. The right is reserved to change, without additional cost, the exact location of any outlet, a maximum of 10' before it is permanently installed.
- D. Orientation of outlet boxes (horizontal or vertical) shall be as indicated on the architectural elevations.
- E. Install all outlet boxes in finished areas flush with the wall. Maintain 1/4" or less space between outlet box front and finished wall surface.
- F. Outlet boxes shall be firmly anchored in place and shall not depend on the coverplate to hold it secure to the wall.
- G. Outlet boxes installed back-to-back in fire-rated walls shall be separated horizontally by a minimum of 24".

3.04 PULL BOXES

- A. Pull boxes shall be secured, independent of the conduit entries into the box. Pull boxes shall be secured to the building structure. In ceiling applications, pull boxes shall not be supported with ceiling wires.
- B. Conduits entering pull boxes shall connect to pull boxes using die-cast zinc connectors.
- C. Pull boxes shall be free from burrs, dirt and debris.
- D. Pull boxes shall be installed in accordance with ANSI/TIA-569-B.
- E. Pull boxes shall be grounded in accordance with ANSI/TIA-607-B.

3.05 CABLE TRAY SYSTEM

- A. Install trays in accordance with recognized industry practices, to ensure that the cable tray equipment complies with requirements of the NEC.
- B. All open trays shall be installed a minimum of six (6) inches away from any light fixture.
- C. Provide external grounding strap at expansion joints, sleeves, crossover and other locations where tray continuity is interrupted.
- D. Support all pathways from building construction. Do not support pathways from ductwork, piping or equipment hangers.
- E. Install cable tray level and straight.

- F. Provide all hardware, accessories, fasteners, anchors, threaded rods and support channels required to provide a complete cable tray system.
- G. Cable trays shall not be used to house both low voltage and power cables unless cables are separated by a grounded physical barrier.
- H. Cable tray system shall be grounded in accordance with ANSI/TIA-607-B.

3.06 CABLE HANGERS

- A. Only use J-hooks to support cables bundles of one hundred (100) or less. J-hooks shall be wall-mounted in pathways containing more than twelve (12) cables
- B. Installation and configuration shall conform to the requirements of ANSI/TIA-568-C.0, ANSI/TIA-568-C.1 & ANSI/TIA-569-B, NFPA 70 (National Electrical Code), applicable local codes, and to the manufacturer's installation instructions.
- C. Install cables using techniques, practices, and methods that are consistent with Category 6 or higher requirements and that supports Category 6 or higher performance of completed and linked signal paths, end to end.
- D. Install cables without damaging conductors, shield, or jacket.
- E. Do not bend cables, in handling or in installing, to smaller radii than minimums recommended by manufacturer.
- F. Pull cables without exceeding cable manufacturer's recommended pulling tensions. Use pulling means that will not damage media.
- G. Do not exceed load and fill ratings specified by manufacturer.
- H. Adjustable non-continuous support sling shall have a static load limit of 100 lbs.
- I. To avoid electromagnetic interference (EMI), pathways shall provide minimum clearances of four feet from motors or transformers, one foot from conduit and cables used for electrical power distribution, and five inches from fluorescent lighting. Pathways shall cross perpendicular to fluorescent lighting and electrical power cables or conduits.

3.07 TIE WRAPS AND VELCRO STRAPS

- A. Tie wraps/Velcro straps shall be installed around cables at intervals of 12" minimum.
- B. Tie wraps shall secure cables to cable trays using an "X" pattern.
- C. Do not over-cinch cables.

3.08 SURFACE MOUNTED RACEWAY

- A. Wiremold ALA3800
 - 1. In the labs it shall be mounted to the floor and secured to the ceiling grid.
 - 2. In the data closet's it shall be secured to the data rack and ladder rack.
- B. Wiremold ALA4800
 - 1. Shall be mounted to the wall. Follow manufactures installation guide.
- C. Connectrac
 - 1. Aluminum track shall be secured to the floor with screws. Follow manufactures installation guide.
 - 2. The MDF side ramps shall be glued down to floor. Follow manufactures installation guide.
- D. Thread
 - 1. Aluminum track shall be secured to the floor with screws. Follow manufactures installation guide.

3.09 IDENTIFICATION

- A. Refer to Section 27 05 53 - Identification for Communications Systems for labeling details.

END OF SECTION 270528

SECTION 270543 - UNDERGROUND DUCTS AND RACEWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Underground Ducts and Raceways for Communications Systems.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Rigid/Intermediate Conduit Manufacturer(s)
 - 1. Allied
 - 2. Triangle
 - 3. Wheatland
 - 4. Youngstown
 - 5. Or Approved Equal (by GCPS)
- B. PVC/HDPE Conduit Manufacturer(s)
 - 1. Carlon
 - 2. Georgia Pipe Company
 - 3. FiberTel

4. Or Approved Equal (by GCPS)
- C. Innerduct/Inner-Conduit Channel Manufacturer(s)
 1. Carlon
 2. Endot Industries
 3. MaxCell
 4. Petroflex
 5. Or Approved Equal (by GCPS)
- D. Marker Tape Manufacturer(s)
 1. William Frick & Associates
 2. Or Approved Equal (by GCPS)
- E. Approved Maintenance Hole/Handhole Manufacturer(s)
 1. Old Castle
 2. Pencil (Handholes Only)
 3. Quazite (Handholes Only)
 4. Or Approved Equal (by GCPS)
- F. Approved Conduit Plug/Cap Manufacturer(s)
 1. Jack Moon
 2. Or Approved Equal (by GCPS)

2.02 CONDUIT SYSTEM

- A. PVC conduit for concrete encasement shall be Type DB, UL Labeled for 90 degrees C cables. Fittings shall be Type DB, solvent type, and from the same manufacturer as the conduit.
- B. Concrete shall have a minimum strength of 2,500 psi at 28 days.
- C. PVC conduit for direct burial shall be Schedule 40, UL Labeled for 90 degrees C cables. Fittings shall be Schedule 40, solvent type, and from the same manufacturer as the conduit.
- D. Rigid and Intermediate Conduit
 1. Rigid conduit, intermediate conduit, couplings, locknuts, bushings, elbows and connectors shall be standard thread. All materials shall be steel. Set screw or non-threaded fittings are not permitted.
 2. Galvanized rigid steel conduit shall be hot dipped galvanized inside and outside, in 10 foot lengths and threaded on both ends. Fittings and bushings shall be threaded, cast or malleable iron, and hot dipped galvanized inside and outside.

E. Non-Metallic Conduit

1. Non-metallic conduit shall be heavy wall, Schedule 40 PVC / HDPE.
2. Couplings and connectors for non-metallic conduit shall be of the same material and be the product of the same manufacturer of the conduit furnished.

F. Conduit Support

1. Conduit straps shall be single-hole cast metal type or two hole galvanized metal type. Conduit clamps shall be spring steel type for use with exposed structural steel.

G. Innerduct/Inner-Conduit Channel

1. Innerduct shall be non-corrugated PVC equipped with mule tape.
2. Inner-conduit channel (MaxCell) shall be 3-channel with each channel equipped with mule tape.
3. See Drawings for innerduct/inner-conduit channel (MaxCell) details.

H. Marker Tape

1. Marker tape shall be detectable, orange for communications, and labeled to indicate the type of circuit buried below.

2.03 MAINTENANCE HOLES/HANDHOLES

A. Maintenance Holes

1. Maintenance holes shall be pre-cast or cast in place concrete with a strength of 3,500 psi at 28 days, and steel reinforced.
2. Maintenance holes shall include a cast iron frame with cover, a hot dipped galvanized steel ladder, and hot dipped galvanized pulling eyes embedded in the concrete opposite each duct entrance and in the floor beneath the cover.
3. Maintenance holes shall be equipped with grounding busbar.
4. Maintenance holes shall be equipped with racking for cable storage.
5. Ground splices and connections at maintenance holes shall be exothermic welds, copper or bronze compression ground fittings, or bolted compression ring lugs.
6. The cover for maintenance holes shall have the lettering, "COMMUNICATIONS."

B. Handholes

1. Handholes shall be non-conductive and shall not require grounding for safety. Handholes shall be unaffected by freeze/thaw and resistant to sunlight and chemicals. Handholes shall be pre-cast polymer concrete, heavy duty rated and bottomless.
2. Handholes shall be equipped with racking for cable storage.

3. Handholes shall have the word "COMMUNICATIONS" molded in the cover by the manufacturer. The cover shall be attached with penta-head stainless steel bolts.
4. Handholes shall be able to withstand 10,000 lbs minimum.
5. See Drawings for handhole dimensions and locations.

2.04 CONDUIT PLUGS/CAPS

A. Conduit Plugs/Caps

1. Conduit plugs shall provide a watertight seal at expose ends of conduits.
2. Conduit plugs shall be conduit size specific.
3. Triplex and Quadplex duct plugs shall provide a watertight seal between the conduit and innerduct(s).
4. Simplex duct plugs shall provide a watertight seal between the innerduct and the cable that occupies it.
5. TDUX inflatable bladders shall be used to seal conduits equipped with MaxCell.

PART 3 - EXECUTION

3.01 CONDUIT SYSTEM

A. Excavation and Backfill

1. Contractor shall call underground utilities locator company before digging.
2. Barricades shall be provided around open holes and trenches. Temporary bridges shall be provided over trenches cut through major sidewalk routes. Major sidewalk routes shall not be closed to pedestrian traffic.
3. Barriers shall be provided to protect landscaping adjacent to the excavation area.
4. When rocks, concrete or other debris are encountered during excavation, remove completely.
5. Where sidewalk sections must be removed for installation of underground ducts, remove the sidewalk sections completely from joint to joint.
6. Where asphalt must be removed for installation of underground ducts, saw cut the asphalt in two, straight, parallel lines.
7. Backfill excavations in 6-inch layers and mechanically compact to 98 percent compaction.
8. Excavated materials may be used as backfill only if the backfill is sand or clean dirt that is free of rocks and debris over 3/4" in diameter.
9. In landscaped areas, backfill and mechanically compact to a depth of 6 inches below grade.
10. Backfill the last 6 inches with clean topsoil. Reseed lawn areas.
11. Restore concrete sidewalks and asphalt.

12. The Contractor shall perform all excavation to install the electrical work herein specified and as indicated on Drawings. During excavation, material for backfilling shall be piled back from the banks of the trench to avoid overloading and to prevent slides and cave-ins. All excavated materials not to be used for backfill shall be removed and disposed of by the Contractor. Grading shall be done to prevent surface water from flowing into trenches and others excavation and any water accumulating therein shall be removed by pumping. All excavation shall be made by open cut.
13. The bottom of the trenches shall be graded to provide uniform bearing and support for conduits, cables, or duct bank on undisturbed soil at every point along its entire length. Overdepths shall be backfilled with loose, granular, moist earth, tamped. Remove unstable soil that is not capable of supporting equipment or installation and replace with specified material for a minimum of 12" below invert of equipment or installation.
14. The trenches shall be backfilled with the excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand and gravel or soft shale, free from large clods of earth and stones, deposited in 6" layers and rammed until the installation has a cover of not less than the adjacent ground but not greater than 2" above existing ground. The backfilling shall be carried on simultaneously on both sides of the trench so that injurious pressures do not occur. The compaction of the filled trench shall be at least equal to 95% of the maximum density as determined by the Standard Proctor Test. Settling the backfill with water will not be permitted. Reopen any trenches not meeting compaction requirements or where settlement occurs, refill, compact, and restore the surface to the grade and compaction indicated, mounded over and smoothed off

B. Duct Banks

1. Duct banks shall be sloped downward toward maintenance holes/handholes and away from buildings a minimum of 6 inches per 100 feet. Duct banks shall not route water from maintenance holes handholes into buildings. Duct banks shall not contain traps between maintenance holes/handholes where water may accumulate.
2. Directional changes in duct banks shall be made with 20' minimum radius bends. Duct banks and direct buried ducts shall be supported on undisturbed soil or on piers extending down to undisturbed soil.
3. Where power and communications duct banks run in parallel, they shall be separated by a minimum of 12 inches.
4. Prior to concrete encasement, ducts, reinforcing steel and ground wires shall be secured with nonmetallic straps or cable ties to nonmetallic duct spacers at intervals not exceeding 8 feet. Duct spacers shall be sized for the ducts being held, and shall provide the minimum spacing between ducts required for concrete flow and by the NEC. Duct spacers shall be anchored to the ground using nonmetallic bands and stakes.
5. Duct banks shall have a minimum of 3 inches of concrete cover on all sides.

6. Where duct banks enter maintenance holes or buildings, they shall be constructed as integral to the wall.
7. Duct bank shall extend to the inside surfaces of the walls, and the duct bank reinforcing shall be integrated with the wall reinforcing.
8. Bell ends shall be provided on ducts where the ducts enter maintenance holes or buildings.
9. Direct buried ducts and fittings shall have bend radii greater than the minimum bend radii of the cables enclosed, and shall not be smaller than the radii of standard manufactured elbows.
10. Direct buried ducts shall be installed parallel to or at right angles to building lines and site features, and as close to curbs and sidewalks as possible to avoid interferences with future landscaping.
11. Where direct buried PVC ducts cannot be buried deep enough to meet the NEC minimum cover requirements, rigid steel conduits shall be installed instead, or a concrete cover shall be poured over the ducts.
12. An orange detectable marker tape (for communications) shall be buried in the backfill approximately 12 inches above duct banks or direct buried cables for the entire length of the duct run.
13. A flexible mandrel and a stiff bristled brush shall be pulled through the ducts to clean them prior to cable pulling.
14. Ducts shall be identified in the maintenance holes and at both ends.

C. Additional OSP Conduit Requirements

1. Leave all empty conduits with a 200-pound test nylon cord pull line.
2. Install a #14 AWG tracer wire in one conduit for the entire length of each duct run.
3. Flattened, dented, or deformed conduits are not permitted and shall be removed and replaced.
4. Install conduit, including homeruns as indicated on the Drawings. Any change resulting in a savings in labor or materials is to be made only in accordance with a contract change. Deviations shall be made only where necessary to avoid interferences and when approved by Engineer by written authorization.
5. Where conduits must pass through structural members obtain approval of Architect or Engineer.
6. Install all conduits or sleeves penetrating or routed within rated firewalls or fire floors to maintain fire rating of wall or floor. Conduit shall not be installed in rated floors or walls if it compromises or violates the fire rating of floor or wall. Refer to architectural documents.
7. Provide expansion and deflection coupling where conduit passes over a building expansion joint.
8. Service entrance conduits and feeder conduits in direct contact with earth shall be schedule 40, heavy wall PVC/HDPE. All service entrance conduit elbows shall be galvanized rigid steel. Service entrance conduits installed exposed or concealed in walls or above ceilings shall be galvanized rigid steel (GRS) or intermediate metal conduit (IMC). Provide concrete encasement where required or as indicated on Drawings.

9. Seal all conduits entering building to prevent entrance of moisture.
10. Conduit fittings shall be gland and ring compression type for all conduit exposed to outdoor environments.
11. Below Grade Conduit Installations
 - a. Install top of conduits 24 inches minimum below finished grade or as indicated on Drawings.
 - b. Install top of conduits 6 inches minimum below bottom of building slabs.
 - c. Where transition is made from below grade PVC installation to a metallic conduit system above grade or slab.
12. Communications cables shall not occupy conduits with power cables.
13. All metallic conduits shall be grounded in accordance with ANSI/TIA-607-B.
14. For runs that total more than 400 feet in length, insert handholes/maintenance holes so that no segment exceeds the 400 feet limit.
15. Conduit runs shall not have more than two (2) 90-degree bends between pull points.
16. Communication conduit system shall contain no condulets (also known as an LB).

3.02 MAINTENANCE HOLES/HANDHOLES

- A. Maintenance holes/handholes shall be installed on a base of pea gravel at least 12 inches deep.
- B. Tops of maintenance holes/handholes shall be level with the existing grade.
- C. Ducts should enter as perpendicular to the wall surface as possible.
- D. Maintenance holes shall be grounded with four 3/4 inch diameter by 8 foot long ground rods, one driven inside of the maintenance hole at each corner. Connect the ground rods and any duct bank ground conductors together with a No. 4/0 AWG bare, stranded copper ground wire loop. A No. 2 AWG bare stranded copper pigtail from the ground wire loop shall be used to ground the maintenance hole cover frame, ladder support bracket, any metallic concrete inserts and metallic cable racks, and the shields of any cables that are spliced in the maintenance hole.

3.03 CONDUIT PLUGS/CAPS

- A. Protect conduits against dirt, plaster, and foreign debris with conduit plugs. Plugs shall remain in place until ready for use.
- B. Simplex, triplex or quadplex duct plugs shall be installed in conduits to house and seal cables.
- C. TDUX inflatable bladders shall be used to seal conduits equipped with MaxCell.

3.04 IDENTIFICATION

- A. Refer to Section 27 05 53 - Identification for Communications Systems for labeling details.

END OF SECTION 270543

SECTION 270553 - IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the equipment and execution requirements relating to Identification for Communications Systems.
- C. Equipment specifications, general considerations, and guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 WORK INCLUDED

- A. The work included under this Specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete installation. The Contractor will provide and install all of the required materials whether specifically addressed in the Specification or not.

PART 2 - LABELING

2.01 LABELING REQUIREMENTS

- A. Labeling shall be done in accordance with the recommendations made in the ANSI/TIA-606-A document, manufacturer's recommendations and best industry practices.
- B. All spaces, pathways, outlets, cables, termination hardware, grounding system and equipment shall be labeled with machine-generated labels.
- C. All labels shall be clear with black text.
- D. All labels shall be black with white text on ceiling grid.
- E. All labels shall be white with black text on patch panel.
- F. All labels shall be white with black text on horizontal cable.
- G. All cables shall be labeled with machine generated, wrap around labels.
- H. Each individual fiber strand will have a machine generated label with the correct color on both ends.

- I. A total of three (3) labels per horizontal cable are required at the following intervals: 6" from outlet; 18" from outlet' 12" from termination block/patch panel.
- J. Labeling scheme shall be alphanumeric.

END OF SECTION 270553

SECTION 270800 - COMMISSIONING OF COMMUNICATIONS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the equipment and execution requirements relating to Commissioning of Communications.
- C. Equipment specifications, general considerations, and guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - TESTING

2.01 TESTING REQUIREMENTS

- A. General
 - 1. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA-568-C.0, ANSI/TIA-568-C.1, and/or ANSI/TIA-1152. All conductors/strands of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors/strands in all cables installed.
- B. Copper Testing
 - 1. All twisted-pair copper cable links shall be tested for continuity, pair reversals, shorts, opens and performance as indicated below. Additional testing is required to verify Category 6/6A performance. Horizontal balanced twisted pair cabling shall be tested using a level III and/or IV test unit for category 6/6A performance compliance.

2. Continuity - Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. The test shall be recorded as pass/fail as indicated by the test unit and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.
3. Length - Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA-568-C.2 Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.
4. Approved tester is as follows:
Fluke DTX

C. Fiber Testing

1. All fiber testing shall be performed on all fibers in the completed end-to-end system. There shall be no splices unless clearly defined in the RFP and/or Drawings. These tests also include continuity checking of each fiber.
2. Multimode
 - a. Test the optical fiber cable bi-directionally with an OTDR and uni-directionally with a power meter/light source. Fiber must be tested at both 850nm and 1300nm. Maximum attenuation dB/Km @ 850nm/1300nm shall be 3.5/1.5. Maximum attenuation per connector pair shall be .75 dB. Attenuation testing shall be performed with a stable launch condition using a one-meter or two-meter jumper, wrapped around a mandrel sized according to fiber type, to attach the light source to the cable plant. Fiber jumper shall be wrapped around mandrel no less than five (5) times. The jumper-mandrel assembly shall remain connected to the light source after calibration and the power meter moved to the far end using a new jumper to take measurements. Test set-up and performance shall be conducted in accordance with ANSI/TIA-568-C.3, and to the manufacturer's application guides.
3. Singlemode
 - a. Test the optical fiber cable bi-directionally with an OTDR and uni-directionally with a power meter/light source. Fiber must be tested at both 1310nm and 1550nm. Maximum attenuation dB/Km @ 1310nm/1550nm shall be 0.5/0.5 for outside plant and 1.0/1.0 for inside plant. Maximum attenuation per connector pair shall be .75 dB. Attenuation testing shall be performed with a stable launch condition using one-meter or two-meter jumpers to attach the test equipment to the cable plant. The light source shall be left in place after calibration and the power meter moved to the far end to take measurements. Test set-up and performance shall be conducted in accordance with ANSI/TIA-568-C.3, and to the manufacturer's application guides.

4. Approved optical fiber test equipment manufacturers are as follows:
 - a. Power Meters & Light Sources
Optical Wavelength Laboratories (OWL)
Noyes
Photonix
Fluke
Agilent
 - b. Optical Time Domain Reflectometers (OTDR)
GN Nettest
Agilent
Fluke
Anritsu
Tektronix

D. Test Results

1. Test documentation shall be provided on disk as part of the as-built package. The disk shall be clearly marked on the outside front cover with the words "Project Test Documentation," the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair (or strand) and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.
2. The field test equipment shall meet the requirements of ANSI/TIA-568-C.2, ANSI/TIA-568-C.3, and/or ANSI/TIA-1152.
3. Printouts generated for each cable by the wire (or fiber) test instrument shall be submitted as part of the documentation package. Alternately, the Contractor may furnish this information in electronic form (CD). These CDs shall contain the electronic equivalent of the test results as defined by the Specification and be of a format readable from Microsoft Word.
4. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.
5. Test results will be submitted in the software format of the tester. As an Example Fluke DTX file output is .flw.

PART 3 - DOCUMENTATION, AS-BUILTS, TRAINING AND RECORDS

3.01 DOCUMENTATION & AS-BUILTS

- A. As-Built record documentation for communications work shall include:
 - 1. Cable routing and identification
 - 2. System function diagrams
 - 3. Manufacturers' description literature for equipment
 - 4. Connection and programming schedules as appropriate
 - 5. Equipment material list including quantities
 - 6. Spare parts list with quantities
 - 7. Details not on original Contract Documents
 - 8. Test results
 - 9. Warranties
 - 10. Release of liens
- B. The Contractor shall provide and maintain at the site a set of prints on which shall be accurately shown the actual installation of all work under this section, indicating any variation from contract drawings, including changes in pathways, sizes, locations and dimensions. All changes shall be clearly and completely indicated as the work progresses.
- C. Progress prints shall be available for inspection by the Owner or any of his representatives and may be used to determine the progress of communications infrastructure work.
- D. At the completion of the work, prepare a new set of as-built drawings, of the work as actually noted on the marked-up prints, including the dimensioned location of all pathways.
- E. Furnish as-built drawings and documentation to the Project Manager. As-built drawings shall be generated in AutoCad 2012 or later. Submit as-built drawings electronically on C.D. and hard copy.

3.02 OPERATIONS AND MAINTENANCE MANUAL

- A. After completion of the work, the Contractor shall furnish and deliver to the Engineer three (3) copies of a complete Operations & Maintenance Manual. A system wiring diagram shall be furnished for each separate system.
- B. The manual shall be subdivided into separate sections with tab dividers to identify subsystems of the integrated system. Reference appropriate Specification sections.
- C. Provide the following additional information for each electronic system. Information shall be edited for this project where applicable.

1. Operations manuals for components and for systems as a whole
2. Maintenance manuals for components and for system as a whole
3. Point-to-point diagrams, cabling diagrams, construction details and cabling labeling details
4. List of spare parts, materials and suppliers of components. Provide name, address and telephone number for each supplier.
5. Emergency instructions for operational and maintenance requirements
6. Delivery time frame for replacement of component parts from suppliers
7. Recommended inspection schedule and procedures for components and for system as a whole
8. List of spare parts, materials and suppliers of components. Provide name, address and telephone number for each supplier.
9. Complete "reviewed" shop drawings and product data for components and system as a whole
10. Troubleshooting procedures for each system and for each major system component

3.03 TRAINING

- A. The Contractor shall be responsible for training of facility personnel. Training shall take place after occupancy and before acceptance and shall include programs for on-site operations and maintenance of technology and communications systems. Training shall be for not more than ten (10) people, shall be held at the Owner's site and shall be of sufficient duration and depth to ensure that the trained personnel can operate the installed systems and can perform usual and customary maintenance actions.

3.04 WARRANTY

A. General

1. All equipment is to be new and warranted free of faulty workmanship and damage.
2. Replacement of defective equipment and materials and repair of faulty workmanship within 24 hours of notification, except emergency conditions (system failures), which must be placed back in service within eight (8) hours of notification, all at no cost to the Owner.
3. The minimum warranty provisions specified shall not diminish the terms of individual equipment manufacturer's warranties.

B. Voice & Data Structured Cabling

1. Manufacturer(s) shall provide a minimum 25-year warranty for components used in the installed Voice & Data Structured Cabling System. Defective and/or improperly installed products shall be replaced and/or correctly installed at no cost to the Owner.

C. Overhead Paging System

1. Manufacturer(s) shall provide a minimum 1-year warranty for components used in the installed Overhead Paging System. Defective and/or improperly installed products shall be replaced and/or correctly installed at no cost to the Owner.

D. Pathway & Support Infrastructure

1. Manufacturer(s) shall provide a minimum 1-year warranty for components used in the installed Pathway & Support Infrastructure. Defective and/or improperly installed products shall be replaced and/or correctly installed at no cost to the Owner.

END OF SECTION 270800

SECTION 271113 - COMMUNICATIONS ENTRANCE PROTECTION

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Communications Entrance Protection.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Building Entrance Protector Terminal Manufacturer(s)
 - 1. Circa
 - 2. Marconi
 - 3. Porta Systems
 - 4. Or Approved Equal (by GCPS)
- B. Approved Bonding Shield Connector Manufacturer(s)
 - 1. 3M
 - 2. Or Approved Equal (by GCPS)

2.02 BUILDING ENTRANCE PROTECTOR TERMINALS

A. Indoor Building Entrance Protector Terminal

1. The indoor building entrance protector terminal shall be equipped with 110-connector inputs and outputs and shall accommodate industry standard 5-pin protection modules.
2. The indoor building entrance protector terminal shall protect up to 100-pairs and shall be equipped with an internal fuse link.
3. The indoor building entrance protector terminal shall be wall or frame mountable, and able to be stacked for future expansion.
4. The indoor building entrance protector terminal shall be equipped with external ground connectors that accept 6-14 AWG ground wire.

B. Solid State Surge Protection Modules

1. The solid-state surge protector module shall be 5-pin and shall provide transient and power fault protection for standard telephone line applications.
2. The solid-state surge protector module shall be designed to provide a balanced configuration to protect against line-to-line metallic surges.
3. The solid-state surge protector module shall feature an external failsafe mechanism, which permanently grounds module under sustained high current conditions.
4. The solid-state surge protector module shall feature nanosecond response time and safe mode operation in adverse situations.
5. The solid-state surge protector module shall be UL & cUL Listed.

2.03 BONDING SHIELD CONNECTOR

A. Shield Connector

1. The purpose of the bonding shield connector is to make a stable, low resistant electrical connection between the shield of a communications cable and a ground conductor.
2. The bonding shield connector shall be tin-plated tempered brass.

PART 3 - EXECUTION

3.01 BUILDING ENTRANCE PROTECTOR TERMINALS

- A. All copper circuits shall be provided with protection between each building with an entrance cable protector panel. All building-to-building circuits shall be routed through this protector. The protector shall be connected with a #6 AWG copper bonding conductor between the protector ground lug and the telecommunications room (TR) busbar.

- B. Building entrance protector shall be installed in accordance with the recommendations contained in the ANSI/TIA-607-B Telecommunications Bonding and Ground Standard.
- C. Building entrance protector panels shall be installed as per the requirements specified by the manufacturer's installation guidelines.

3.02 BONDING SHIELD CONNECTOR

- A. Bonding shield connector shall be installed in accordance with the recommendations contained in the ANSI/TIA-607-B Standard.
- B. Bonding shield connector shall be installed as per the requirements specified by the manufacturer's installation guidelines.

3.03 IDENTIFICATION

- A. Refer to Section 270553 - Identification for Communications Systems for labeling details.

END OF SECTION 271113

SECTION 271116 - COMMUNICATIONS CABINETS, RACKS AND ENCLOSURES

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Communications Cabinets, Racks and Enclosures.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Equipment Rack/Cabinet Manufacturer(s)
 - 1. Chatsworth Products, Inc.
 - 2. Hoffman
 - 3. B-Line
 - 4. Panduit
 - 5. Or Approved Equal (by GCPS)

2.02 EQUIPMENT RACKS/CABINETS

- A. Equipment Racks
 - 1. The equipment rack shall be constructed of high strength, lightweight aluminum.

2. The vertical rails of the equipment rack shall be equipped with the EIA hole pattern.
 3. Rack shall be: 2-post.
 4. Rack shall be: 7'H x 19"W floor mounted.
 5. Rack shall be: 36"H x 19"W wall mounted (hinged).
 6. Rack color shall be clear
- B. Equipment Cabinets
1. The frame of the equipment cabinet shall be constructed of high strength, lightweight aluminum or high strength steel.
 2. Front and rear doors of the equipment cabinet shall be vented and lockable.
 3. Cabinet enclosure shall have 4 lockable wheels.
 4. The vertical rails of the equipment cabinet shall be equipped with the EIA hole pattern.
 5. The equipment cabinet shall be equipped with a fan unit.
 6. Cabinet shall be: 7'H x 24"W x 30"D (minimum dimensions) floor mounted.
 7. Smaller cabinet shall be: 48"H x 19"W x 24"D (minimum dimensions) floor mounted.
 8. Cabinet shall be: 36"H x 24"W x 24"D wall mounted. 19" rail sets.
 9. Smaller cabinet shall be: 29"H x 26"W x 15"D wall mounted.
 10. Cabinet color shall be black.

PART 3 - EXECUTION

3.01 EQUIPMENT RACKS/CABINETS

- A. Equipment racks shall be securely attached to the concrete floor using minimum 3/8" hardware or as required by local codes.
- B. Equipment cabinets shall be installed as per the requirements specified by the manufacturer's installation guidelines.
- C. Equipment racks/cabinets shall be placed with a minimum of 40-inch clearance from the walls from the front and rear of the rack or as indicated on Drawings.
- D. All equipment racks/cabinets shall be grounded to the telecommunications ground bus bar.
- E. Mounting screws not used for installing patch panels and other hardware shall be bagged and left with the rack upon completion of the installation.
- F. Contractor shall provide one (1) 25-count bag of rack screws per rack for GCPS personnel. These screws are in addition to what will be used by the contractor to mount the equipment that they are contracted to install.

3.02 BACKBOARDS

- A. Backboards shall be 3/4" void free plywood. Size of backboard shall be 4' x 8' unless noted differently on Drawings. Backboards shall be painted with two (2) coats of gray fire-retardant paint.

3.03 IDENTIFICATION

- A. Refer to Section 270553 - Identification for Communications Systems for labeling details.

END OF SECTION 271116

SECTION 271119 - COMMUNICATIONS TERMINATION BLOCKS AND PATCH PANELS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Communications Termination Blocks and Patch Panels.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Patch Panel Manufacturer(s)
 - 1. Leviton
 - a. Patch Panel - QuickPort
 - b. Jacks - eXtreme 6+
 - c. Wifi Jacks – eXtreme 6A
 - 2. Hubbell
 - a. Patch Panel – UDX Multimedia
 - b. Jacks – NEXTSPEED XCELERATOR 6
 - c. WiFi Jacks – NEXTSPEED Ascent Category 6A
 - 3. Panduit – NetKey
 - a. Patch Panel – Modular NKFP Series
 - b. Jacks – NetKey NK688 Series
 - c. WiFi Jacks – NetKey 6A 10Gig NK6X Series

4. CommScope - Uniprise
 - a. Patch Panel – M2000 Series
 - b. Jacks – UNJ600
 - c. Wifi Jacks – UNJ10G
 5. Belden
 - a. Patch Panel – REVConnect or AX10xxxx Series
 - b. Jacks – 6+ REVConnect or AX10xxxx Series
 - c. Wifi Jacks – 10GX REVConnect or AX10xxxx Series
 6. No Exceptions
- B. Approved Optical Fiber Enclosure Manufacturer(s)
1. Leviton
 - a. Rack Mount - Opt-X 1000i
 - b. Wall Mount – Opt-X 1000
 2. Hubbell
 - a. Rack Mount - OptiChannel FCR
 - b. Wall Mount – OptiChannel FTU
 3. Panduit
 - a. Rack Mount - Opticom FRME
 - b. Wall Mount – Opticom FWME
 4. CommScope - Uniprise
 - a. Rack Mount - Ready
 - b. Wall Mount – Ready
 5. Belden
 - a. Rack Mount-FX ECX
 - b. Wall Mount-FX
 6. No Exceptions
- C. Approved Termination Block Manufacturer(s)
1. Leviton
 2. Hubbell
 3. Panduit
 4. CommScope – Uniprise
 5. Belden
 6. No Exceptions

2.02 PATCH PANELS

A. Category 6e Patch Panel

1. The Category 6e patch panel shall be modular in design and equipped with Cat 6e jacks.
2. The Category 6e patch panel shall be compatible with 19" equipment racks, cabinets or wall mount brackets.
3. The Category 6e patch panel shall be flat.

4. The Category 6e patch panel shall be equipped with front labeling space to facilitate port identification.
5. The connector module shall exceed the Category 6 performance criteria per ANSI/TIA-568-C.2.
 - a. Icons shall be used if offered from the manufacturer.
 - b. Jack/Icon colors shall be:
 - Black for voice
 - Blue for data
 - Yellow for intercom
 - Gray for video surveillance

B. Category 6A Patch Panel (WiFi)

1. The Category 6A patch panel shall be modular in design and equipped with Cat 6A jacks.
2. The Category 6A patch panel shall be compatible with 19" equipment racks, cabinets or wall mount brackets.
3. The Category 6A patch panel shall be flat.
4. The Category 6A patch panel shall be equipped with front labeling space to facilitate port identification.
5. The connector module shall exceed the Category 6A performance criteria per ANSI/TIA-568-C.2.
 - a. Icons shall be used if offered from the manufacturer.
 - b. Jack/Icon colors shall be:
 - Green for WiFi

2.03 OPTICAL FIBER PANELS/ENCLOSURES

A. Rack Mount Optical Fiber Panel/Enclosure

1. The rack mount optical fiber panel/enclosure shall be equipped with either a swing out mechanism or a sliding drawer to access fibers.
2. The rack mount optical fiber panel/enclosure shall be capable of terminating tight-buffered or loose tube optical fiber cable.
3. The rack mount optical fiber panel/enclosure shall provide for bend radius control throughout the panel as well as storage space for slack cabling.
4. The panel/enclosure shall meet or exceed the performance criteria per ANSI/TIA-568-C.3.
5. The rack mount optical fiber panel/enclosure shall be equipped with optical fiber adapter panels from same manufacturer.
 - a. The optical fiber adapter panels shall accommodate either multimode or singlemode terminated optical fiber.
 - b. The optical fiber adapter panels shall be compatible with LC connectors.
 - c. OM3 laser optimized adaptors shall be aqua in color and equipped with zirconia ceramic sleeves.
 - d. Singlemode adaptors shall be blue or green in color and equipped with zirconia ceramic sleeves.

B. Wall Mount Optical Fiber Panel/Enclosure

1. The wall mount optical fiber panel/enclosure shall have a hinged door for access, with locking available for security.
2. The wall mount optical fiber panel/enclosure shall be capable of terminating tight-buffered or loose tube optical fiber cables and all popular connector types.
3. The wall mount optical fiber panel/enclosure shall provide for bend radius control throughout the panel as well as storage space for slack cabling.
4. The panel/enclosure shall meet or exceed the performance criteria per ANSI/TIA-568-C.3.
5. The wall mount optical fiber panel/enclosure shall be equipped with optical fiber adapter panels from same manufacturer.
 - a. The optical fiber adapter panels shall accommodate either multimode or singlemode terminated optical fiber.
 - b. The optical fiber adapter panels shall be compatible with LC connectors.
 - c. OM3 laser optimized adaptors shall be aqua in color and equipped with zirconia ceramic sleeves.
 - d. Singlemode adaptors shall be blue or green in color and equipped with zirconia ceramic sleeves.

2.04 TERMINATION BLOCKS

A. 110 Type Wiring Blocks/Cross-Connect Kits:

1. The 110-type wiring blocks shall be available in 100- and/or 300-pair configurations.
2. The 110-type wiring block shall be Category 5e for backbone terminations and Category 6 for horizontal terminations.
3. The cross-connect kits shall include all the components required to complete a wall-mounted 110 cross-connect installation and be available in both 100-pair and 300-pair configurations for Cat5e and 96-pair and 288-pair configurations for Cat 6. (Includes 110-blocks, connecting blocks and designation strips).
4. The termination block shall meet or exceed the performance criteria per ANSI/TIA-568-C.2.
5. Backbone blocks shall use 5-pair connecting blocks on each 25-pair row.
6. Horizontal blocks shall use 4-pair connecting blocks on each 25-pair row.

B. 66-Blocks

1. The 66-type wiring block shall be a 50-pair configuration.
2. The 66-type wiring block shall have a split clip system using bridge clips to connect incoming pairs to outgoing pairs.
3. The 66 block's labeling system shall use designation strips or covers to accommodate labels.

PART 3 - EXECUTION

3.01 PATCH PANELS

- A. Cables shall be dressed and terminated in accordance with the recommendations made in ANSI/TIA-568-C.0 and/or ANSI/TIA-568-C.1, manufacturer's recommendations and best industry practice.
- B. Pair untwist at the termination shall not exceed 13 mm (0.5 inch).
- C. Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.
- D. Cables shall be neatly bundled and dressed to their respective patch panel. Each patch panel shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame. The cable bundle shall be securely attached to the cable strain relief bracket on back of patch panel.
- E. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

3.02 OPTICAL FIBER PANELS/ENCLOSURES

- A. Cables shall be dressed and terminated in accordance with the recommendations made in ANSI/TIA-568-C.0 and/or ANSI/TIA-568-C.1, manufacturer's recommendations and best industry practices.
- B. Each cable shall be individually attached to the respective splice enclosure by mechanical means. The cables strength member shall be securely attached to the cable strain relief bracket in the enclosure.
- C. Bend radius of the optic fiber cable in the panel/enclosure shall not exceed 10 times the outside diameter of the cable.
- D. Each fiber bundle shall be stripped upon entering the splice tray and the individual fibers routed in the splice tray.
- E. Each cable shall be clearly labeled at the entrance to the splice enclosure. Cables labeled within the bundle shall not be acceptable.
- F. A maximum of 12 strands of fiber shall be spliced in each fiber splice tray.
- G. All spare strands shall be installed into spare splice trays.
- H. Fiber slack shall be neatly coiled within the fiber splice tray or enclosure. No slack loops shall be allowed external to the fiber panel.

3.03 TERMINATION BLOCKS

- A. Cables shall be dressed and terminated in accordance with the recommendations made in ANSI/TIA-568-C.0 and/or ANSI/TIA-568-C.1, manufacturer's recommendations and best industry practice.
- B. Pair untwist at the termination shall not exceed 13 mm (0.5 inch).
- C. Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.
- D. Cables shall be neatly bundled and dressed to their respective termination block. Each termination block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- E. Each cable shall be clearly labeled on the cable jacket within 12" of the termination block at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.
- F. Wall mounted termination block fields shall be mounted on communications backboard.
- G. Wall mounted termination block fields shall be installed as per the requirements specified by the manufacturer's installation guidelines.

3.04 IDENTIFICATION

- A. Refer to Section 270553 - Identification for Communications Systems for labeling details.

END OF SECTION 271119

SECTION 271123 - COMMUNICATIONS CABLE MANAGEMENT AND LADDER RACK

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Communications Cable Management and Ladder Rack.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Horizontal Cable Management Manufacturer(s)
 - 1. Leviton Versi-Duct series
 - 2. Hubbell Plastic Finger Duct series
 - 3. Panduit Patchlink WMP series
 - 4. CommScope – Uniprise HTK series
 - 5. Chatsworth Products, Inc. (CPI) Universal series
 - 6. Belden BHH series
 - 7. No Exceptions
- B. Approved Vertical Cable Management Manufacturer(s)
 - 1. Leviton
 - 2. Hubbell

3. Panduit
4. CommScope - Uniprise
5. Chatsworth Products, Inc. (CPI)
6. No Exceptions

C. Approved Ladder Rack System Manufacturer(s)

1. Chatsworth Products, Inc. (CPI)
2. Hoffman
3. No Exceptions

D. Approved C-Ring/D-ring Manufacturer(s)

1. Chatsworth Products, Inc. (CPI)
2. Or Approved Equal (by GCPS)

2.02 CABLE MANAGEMENT - HORIZONTAL

A. Horizontal Cable Management

1. The horizontal wire manager shall be compatible with 19-inch equipment racks, cabinets or wall mount brackets.
2. The horizontal cable manager shall provide support for patch cords at the front of the panel.
3. The horizontal cable manager shall be 2 rack-units in height when matched with a 2 rack-unit patch panel or switch.
4. The horizontal cable manager shall be 1 rack-unit in height when matched with a 1 rack-unit patch panel or switch.

2.03 CABLE MANAGEMENT - VERTICAL

A. Vertical Cable Management

1. The vertical cable manger shall be double-sided.
2. The vertical cable manager shall provide support for patch cords at the front of the rack and wire management at the rear of the rack.
3. The vertical cable manager shall be a minimum width of 6".
4. Vertical cable manager color shall be black.

2.04 LADDER RACKS

A. Ladder Rack System

1. See Drawings for ladder rack system details.
2. The ladder rack system shall be securely mounted with hardware designed for use in ladder rack systems.

3. End caps shall be installed on the exposed ends of the ladder racks, channel supports and bolts. Protective covers shall be installed on threaded rods that come in contact with cabling plant.
4. Ladder Rack System color shall be black.

2.05 TIE WRAPS AND VELCRO STRAPS

A. Tie Wraps and Velcro Straps

1. Backbone cables shall be fastened to support structures with tie wraps/Velcro straps.
2. Horizontal cables shall be fastened to support structures with Velcro straps.
 - a. Tie Wrap color shall be black (or red in plenum spaces).
 - b. Velcro Strap color shall be black (or red in plenum spaces).

2.06 C-RINGS/D-Rings

A. C-Rings/D-rings

1. C-rings/D-rings shall be used on backboards to support cables, patch cords and cross-connect wire.
2. C-rings/D-rings shall be made of high-strength, fire-retardant material with rounded edges to prevent damage to cable and wire insulation.

PART 3 - EXECUTION

3.01 CABLE MANAGEMENT - HORIZONTAL

- A. Horizontal cable managers shall be installed below patch panels in a 1:1 ratio (one horizontal cable manager per patch panel) or as indicated on Drawings.

3.02 CABLE MANAGEMENT - VERTICAL

- A. Vertical cable managers shall be installed on both sides of a single equipment rack. Where two (2) or more racks are positioned in a row, vertical cable managers shall be installed between each rack and each end of the row.

3.03 LADDER RACKS

- A. Ladder rack system shall be installed straight, level and perpendicular to walls and ceiling slabs.
- B. Ladder racks shall be supported at 5' intervals maximum.
- C. Provide all hardware, accessories, fasteners, anchors, threaded rods and support channels required to provide a complete ladder rack system.

- D. See Drawings for ladder rack system details.

3.04 TIE WRAPS AND VELCRO STRAPS

- A. Tie wraps/Velcro straps shall be installed around cables at intervals of 12" minimum.
- B. Tie wraps shall secure cables to ladder racks using an "X" pattern.
- C. Do not over-cinch cables.

3.05 C-RINGS/D-RINGS

- A. C-ring/D-rings shall be installed on 3/4" backboard, straight and level.

3.06 IDENTIFICATION

- A. Refer to Section 270553 - Identification for Communications Systems for labeling details.

END OF SECTION 271123

SECTION 271126 - COMMUNICATIONS RACK MOUNTED POWER DISTRIBUTION

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Communications Rack Mounted Power Distribution.
- C. Product Specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Power Distribution Unit Manufacturer(s)
 - 1. Leviton
 - 2. Geist
 - 3. Or Approved Equal (by GCPS)

2.02 POWER DISTRIBUTION UNITS

- A. Power Distribution Unit
 - 1. The power distribution unit shall be equipped with a minimum of twelve (12) 3-prong, 120 VAC outlets, and 12' cord.
 - 2. The power distribution unit shall be equipped with surge protection with a 20 Amp current limit.

3. The power distribution unit shall be equipped with a bracket that enables it to be mounted on a 19" rack, cabinet or wall mount bracket without modification.

PART 3 - EXECUTION

3.01 POWER DISTRIBUTION UNITS

- A. Power distribution units shall be installed as per the requirements specified by the manufacturer's installation guidelines.
- B. See Drawings for installation location on rack(s)/cabinet(s).

3.02 IDENTIFICATION

- A. Refer to Section 270553 - Identification for Communications Systems for labeling details.

END OF SECTION 271126

SECTION 271313 - COMMUNICATIONS COPPER BACKBONE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Communications Copper Backbone.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Copper Backbone Cable (Inside Plant) Manufacturer(s)
 - 1. Berk-Tek
 - 2. Hubbell
 - 3. General
 - 4. Commscope
 - 5. Belden
 - 6. No Exceptions
- B. Approved Copper Backbone Cable (Outside Plant) Manufacturer(s)
 - 1. General
 - 2. Hubbell
 - 3. Commscope

4. No Exceptions

2.02 COPPER BACKBONE CABLE (INSIDE PLANT)

A. CAT5E 100-Ohm Balanced Twisted Pair Building Backbone Cables (Inside Plant)

1. Generic Characteristics

- a. The inside plant, balanced twisted pair building backbone cable shall meet the 100-Ohm balanced twisted pair backbone requirements per the latest issue of ANSI/TIA-568-C.2.
- b. The inside plant, 100-Ohm balanced twisted pair cable shall be CMR or CMP rated (according to the space it occupies).
- c. The inside plant, balanced twisted pair building backbone cable core shall consist of 25-pair sub-units.

2.03 COPPER BACKBONE CABLE (OUTSIDE PLANT)

A. CAT5E 100-Ohm PE-89 Backbone Cables (Outside Plant)

1. Generic Characteristics

- a. The outside plant backbone cable shall be assigned the RDUP designation of PE-89.
- b. The outside plant backbone cable core shall consist up to 25-pair sub-units.
- c. The outside plant backbone cable shall contain water-blocking gel and have a jacket made of polyethylene.

PART 3 - EXECUTION

3.01 BACKBONE CABLES (INSIDE PLANT)

- A. Cables shall be dressed and terminated in accordance with the recommendations made in ANSI/TIA-568-C.0 and/or ANSI/TIA-568-C.1, manufacturer's recommendations and best industry practices.
- B. Backbone cables shall be installed separately from horizontal distribution cables
- C. A plastic or nylon pull cord with a minimum test rating of 90 Kg (200 lb.) shall be co-installed with all cable installed in any conduit.
- D. Where cables are housed in conduits, the backbone and horizontal cables shall be installed in separate conduits
- E. Exposed cables must be CMP or MMP rated if installed in an air return plenum. CMR rated cables shall be installed in metallic conduit if installed in an air return plenum.

- F. Where backbone cables and distribution cables are installed in a cable tray or wireway, backbone cables shall be installed first and bundled separately from the horizontal distribution cables.
- G. Leave 10' of slack on each end of copper backbone cable.
- H. Backbone cables spanning more than three floors shall be securely attached at the top of the cable run with a wire mesh grip and on alternating floors or as required by local codes.
- I. Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable.
- J. Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.
- K. The cable's minimum bend radius and maximum pulling tension shall not be exceeded. Refer to manufacturer's requirements.
- L. Copper cables shall be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- M. Each copper cable shall be clearly labeled on the cable jacket behind the patch panel or block at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.
- N. Copper backbone cables shall be installed separately from horizontal distribution cables

3.02 BACKBONE CABLES (OUTSIDE PLANT)

- A. All OSP cables brought to the Entrance Facilities shall have 15 ft of slack coiled and secured to the wall in the proximity of the termination field.
- B. All cables shall be tagged and identified within each handhole/maintenance hole.
- C. Place initial cables in bottom conduits to facilitate easy subsequent cable placement.
- D. Place leader guard in the duct before placing cable to prevent damaging the cable sheath on the sharp edge of the duct.
- E. Ventilate maintenance where gas has been detected before entering the maintenance hole.
- F. A 600 lb. break-away swivel, along with a slip clutch capstan winch that shows the dynamometer (pulling tension) reading, shall be used at all times during pulling.

- G. At each splice location the cable ends will be sealed watertight at all times. Reels will be continuously manned during cable installation.
- H. Copper backbone cables shall be bonded and grounded in accordance with the recommendations made in the ANSI/TIA-607-B standard, manufacturer's recommendations and best industry practice.

3.03 IDENTIFICATION

- A. Refer to Section 270553 - Identification for Communications Systems for labeling details.

END OF SECTION 271313

SECTION 271323 - COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Communications Optical Fiber Backbone Cabling.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Optical Fiber Backbone Cable (Inside Plant) Manufacturer(s)
 - 1. Berk-Tek
 - 2. Mohawk
 - 3. General
 - 4. CommScope
 - 5. Belden
 - 6. Corning
 - 7. No Exceptions
- B. Approved Optical Fiber Backbone Cable (Outside Plant) Manufacturer(s)
 - 1. Berk-Tek
 - 2. Mohawk

3. General
 4. Commscope
 5. Belden
 6. Corning
 7. No Exceptions
- C. Approved Optical Fiber Connectivity Manufacturer(s)
1. Leviton
 2. Hubbell
 3. Panduit
 4. Commscope
 5. Belden
 6. Corning
 7. No Exceptions
- D. Approved Splice Case Manufacturer(s)
1. 3M
 2. Or Approved Equal (by GCPS)

2.02 OPTICAL FIBER BACKBONE CABLE (INSIDE PLANT)

- A. Armored Plenum - Indoor Distribution 850nm Laser-Optimized 50/125 Multimode Optical Fiber Conductive (OFCP) Tight Buffered Cable (OM3)
1. Generic Characteristics
 - a. The indoor optical fiber cable shall be available with up to twelve 900-micron tight-buffered 250-micron fibers placed in a color-coded sub-unit bundle with aramid strength elements.
 - b. The indoor optical fiber cable shall meet or exceed the performance criteria found in ANSI/TIA-568-C.3.
 - c. The indoor optical fiber cable shall be armored.
 - d. Maximum attenuation dB/Km @ 850/1300 nm: 3.5/1.5
 - e. Minimum overfilled modal bandwidth: 1500 MHz-km @ 850 nm.
 - f. Minimum overfilled modal bandwidth: 500 MHz-km @ 1300 nm.
 - g. Minimum effective modal bandwidth: 2000 MHz-km @ 850nm
- B. Armored Plenum - Indoor Distribution 8.3/125-micron Singlemode Optical Fiber Conductive (OFCP) Tight Buffered Cable (OS2)
1. Generic Characteristics
 - a. The indoor optical fiber cable shall be available with up to twelve 900-micron tight-buffered, 250-micron fibers placed in a color-coded sub-unit bundle with aramid strength elements.
 - b. The indoor optical fiber cable shall meet or exceed the performance criteria found in ANSI/TIA-568-C.3.

- c. The indoor optical fiber cable shall be armored.
 - d. All singlemode fibers shall be 900 um buffered pigtail spliced into a rack mounted optical fiber enclosure or wall-mounted enclosure.
 - e. The loss of fiber shall not exceed 1.0 dB per kilometer @ 1550 nm and 1.0 dB per kilometer @ 1310 nm.
- C. Armored Riser - Indoor 850nm Laser Optimized 50/125 Multimode Optical Fiber Conductive (OFCR) Loose Tube Cable (OM3)
- 1. Generic Characteristics
 - a. The indoor optical fiber cable with up to twelve 250-micron coated fibers placed in a color-coded sub-unit bundle.
 - b. The indoor optical fiber cable shall meet or exceed the performance criteria found in ANSI/TIA-568-C.3.
 - c. The indoor optical fiber cable shall be armored.
 - d. Maximum attenuation dB/Km @ 850/1300 nm: 3.5/1.5
 - e. Minimum overfilled modal bandwidth: 1500 MHz-km @ 850 nm.
 - f. Minimum overfilled modal bandwidth: 500 MHz-km @ 1300 nm.
 - g. Minimum effective modal bandwidth: 2000 MHz-km @ 850nm
- D. Armored Riser - Indoor 8.3/125-micron, Singlemode Optical Fiber Conductive (OFCR) Loose Tube cable (OS2)
- 1. Generic Characteristics
 - a. The indoor optical fiber cable with up to twelve 250-micron coated fibers placed in a color-coded sub-unit bundle.
 - b. The indoor optical fiber cable shall meet or exceed the performance criteria found in ANSI/TIA-568-C.3.
 - c. The indoor optical fiber cable shall be armored.
 - d. All singlemode fibers shall be pigtail spliced into a rack mounted optical fiber panel or wall-mounted enclosure.
 - e. The loss of fiber shall not exceed 0.50 dB per kilometer @ 1550 nm and 0.50 dB per kilometer @ 1310 nm.

2.03 OPTICAL FIBER BACKBONE CABLE (OUTSIDE PLANT)

- A. Indoor/outdoor 850nm Laser Optimized 50/125 Multimode Optical Fiber Non-Conductive (OFNR) Loose Tube Cable (OM3)
- 1. Generic Characteristics
 - a. The indoor/outdoor optical fiber cable with up to twelve 250-micron coated fibers placed in a color-coded sub-unit bundle with moisture-blocking gel.
 - b. The indoor/outdoor optical fiber cable shall meet or exceed the performance criteria found in ANSI/TIA-568-C.3.
 - c. The indoor/outdoor optical fiber cable shall have sequential length markings printed on the cable jacket.

- d. Maximum attenuation dB/Km @ 850/1300 nm: 3.5/1.5
 - e. Minimum overfilled modal bandwidth: 1500 MHz-km @ 850 nm.
 - f. Minimum overfilled modal bandwidth: 500 MHz-km @ 1300 nm.
 - g. Minimum effective modal bandwidth: 2000 MHz-km @ 850nm
- B. Indoor/outdoor 8.3/125-micron, Singlemode Optical Fiber Non-Conductive (OFNR) Loose Tube cable (OS2)
1. Generic Characteristics
 - a. The indoor/outdoor optical fiber cable with up to twelve 250-micron coated fibers placed in a color-coded sub-unit bundle with moisture-blocking gel.
 - b. The indoor/outdoor optical fiber cable shall meet or exceed the performance criteria found in ANSI/TIA-568-C.3.
 - c. The indoor/outdoor optical fiber cable shall have sequential length markings printed on the cable jacket.
 - d. All singlemode fibers shall be pigtail spliced into a rack mounted optical fiber enclosure or wall-mounted enclosure.
 - e. The loss of fiber shall not exceed 0.50 dB per kilometer @ 1550 nm and 0.50 dB per kilometer @ 1310 nm.

2.04 OPTICAL FIBER CONNECTORS

- A. Laser Optimized Multimode Fiber Connectivity OM3
1. The optical fiber shall be LC pigtail spliced for installation onto multimode a laser optimized 50/125-micron fiber.
 2. The optical fiber pigtail connector shall be compatible with 900-micron buffered fibers.
 3. The optical fiber pigtail connector shall meet or exceed the performance criteria found in ANSI/TIA-568-C.3.
 4. The optical fiber pigtail connector shall have a maximum Loss of 0 .5 dB.
 5. The optical fiber adapter module that occupies the faceplate shall be equipped with zirconia ceramic sleeve.
 6. Laser optimized multimode fiber connector color shall be aqua.
- B. Singlemode Fiber Connectivity
1. The optical fiber shall be LC pigtail spliced connector for installation onto singlemode 8.3/125-micron fiber.
 2. The optical fiber pigtailed connector shall meet or exceed the performance criteria found in ANSI/TIA-568-C.3.
 3. The optical fiber pigtail connector shall be compatible with 900-micron buffered fibers or 250-micron loose-tube fibers.

4. The preferred method of terminating loose-tube singlemode fiber is pigtail splicing into a rack mounted optical fiber panel or wall-mounted enclosure. Pigtails shall be factory terminated and 3 meters in length. A fiber enclosure with slack storage trays must be used when pigtail-splicing method is used.
5. The splice loss through each connector pair shall not exceed 0.50 dB.
6. The optical fiber adapter module that occupies the faceplate shall be equipped with zirconia ceramic sleeve.
7. Singlemode LC fiber connector color shall be blue.
8. Singlemode LC/APC or SC/APC connector shall be green.

2.05 SPLICE CASES

A. Canister Splice Case

1. Splice cases shall be water tight and designed for outside plant applications.
2. All splice trays, seals and hardware shall be from the same manufacturer as the splice case.
3. Splice trays shall utilize heat-shrink seals.
4. See Drawings for size requirements.

PART 3 - EXECUTION

3.01 BACKBONE CABLES (INSIDE PLANT)

- A. Cables shall be dressed and terminated in accordance with the recommendations made in ANSI/TIA-568-C.0 and/or ANSI/TIA-568-C.1, manufacturer's recommendations and best industry practices.
- B. Backbone cables shall be installed separately from horizontal distribution cables
- C. A plastic or nylon pull cord with a minimum test rating of 90 Kg (200 lb.) shall be co-installed with all cable installed in any conduit.
- D. Where cables are housed in conduits, the backbone and horizontal cables shall be installed in separate conduits
- E. Exposed cables must be OFCP or OFNP rated if installed in an air return plenum. Riser rated cables shall be installed in metallic conduit if installed in an air return plenum.
- F. Where backbone cables and distribution cables are installed in a cable tray or wireway, backbone cables shall be installed first and bundled separately from the horizontal distribution cables.
- G. Leave 10' of slack on each end of fiber backbone cable.

- H. Backbone cables spanning more than three floors shall be securely attached at the top of the cable run with a wire mesh grip and on alternating floors or as required by local codes.
- I. Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable.
- J. Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.
- K. The cable's minimum bend radius and maximum pulling tension shall not be exceeded. Refer to manufacturer's requirements.
- L. Each optical fiber cable shall be individually attached to the respective enclosure by mechanical means. The cables strength member shall be securely attached the cable strain relief bracket in the enclosure.
- M. Each optical fiber cable shall be clearly labeled at the entrance to the enclosure. Cables labeled within the bundle shall not be acceptable.
- N. Each fiber bundle shall be stripped upon entering the splice tray and the individual fibers routed in the splice tray.
- O. A maximum of 12 strands of fiber shall be spliced in each splice tray
- P. All spare fiber strands shall be installed into spare splice trays.
- Q. Fiber slack shall be neatly coiled within the fiber splice tray or enclosure. No slack loops shall be allowed external to the fiber panel.

3.02 BACKBONE CABLES (OUTSIDE PLANT)

- A. All OSP cables brought to the Entrance Facilities shall have 15 ft of slack coiled and secured to the wall in the proximity of the fiber enclosure.
- B. All cables shall be tagged and identified within each handhole/maintenance hole.
- C. Place initial cables in bottom conduits to facilitate easy subsequent cable placement.
- D. Place leader guard in the duct before placing cable to prevent damaging the cable sheath on the sharp edge of the duct.
- E. Ventilate maintenance where gas has been detected before entering the maintenance hole.
- F. To ensure that the optical fiber cable's qualities and characteristics are not degraded during installation, excessive pulling tensions and short bending radii will not be allowed. The maximum pulling tension is 600 lbs. The minimum bending radius for cable under

tension is 20 times the outside diameter of the cable and for cable at rest is 10 times the outside diameter of the cable.

- G. A 600 lb. break-away swivel, along with a slip clutch capstan winch that shows the dynamometer (pulling tension) reading, shall be used at all times during pulling.
- H. At each splice location the cable ends will be sealed watertight at all times. Reels will be continuously manned during cable installation.
- I. Contractor shall coil 60 feet of spare optical fiber cable in each handhole/maintenance hole without a splice and 75 feet of each optical fiber cable in each handhole/maintenance hole with a splice. Cable coils shall have at least two points of support on the optical fiber racking system.
- J. When mounting the optical fiber slack coils, the minimum bend radius shall not be exceeded; this radius is equal to 10 times the outside diameter of the cable in a static application and 20 times the outside diameter in a dynamic application. At anytime during the entire handling process of the optical fiber cable, as much care as possible should be maintained and all the manufacturer's recommendations should be followed.

3.03 OPTICAL FIBER CONNECTIVITY / SPLICING

- A. Optical fiber connectors shall be installed as per the requirements specified by the manufacturer's installation guidelines.
- B. All splicing shall be of the fusion type made under Light Injection and Detection Mode, whenever applicable. The Contractor shall provide certified and experienced personnel for splicing.
- C. Contractor's tools and equipment shall be in excellent working order. Any worn or improperly working tools shall be discarded and not used on this project. All fusion splicers shall be calibrated and labeled according to the manufacturer's specifications. Contractor shall submit certification of calibration for the fusion splicers to the Engineer.

3.04 SPLICE CASES

- A. Splice Cases shall be installed as per the requirements specified by the manufacturer's installation guidelines.

3.05 IDENTIFICATION

- A. Refer to Section 270553 - Identification for Communications Systems for labeling details.

END OF SECTION 271323

SECTION 271513 - COMMUNICATIONS COPPER HORIZONTAL CABLING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Communications Copper Horizontal Cabling.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Horizontal Copper Cable Manufacturer(s)
 - 1. Berk-Tek – LANmark 1000
 - 2. Hubbell-NextSpeed 6e
 - 3. General – GenSPEED 6000e
 - 4. CommScope / Uniprise – UltraMedia 7504
 - 5. Belden – 2400 series cat6+
 - 6. No Exceptions
- B. Approved WiFi Horizontal Copper Cable Manufacturer(s)
 - 1. Berk-Tek – LANmark 10G2
 - 2. Hubbell-Nextspeed Ascent 10GbE
 - 3. General – GenSPEED 10,000

4. CommScope / Uniprise – Ultra 10 10G4
5. Belden – 10GXS
6. No Exceptions

2.02 HORIZONTAL COPPER CABLE

A. 100 OHM Category 6e Balanced Twisted Pair Cable

1. The horizontal balanced twisted pair cable shall exceed the Category 6 transmission characteristics per issue of ANSI/TIA-568-C.2.
2. Cable jacket shall be CMP rated.
3. Jacket color shall be:
 - a. Blue for data
 - b. Yellow for intercom

2.03 WIFI HORIZONTAL COPPER CABLE

A. 100 OHM Category 6A Balanced Twisted Pair Cable

1. The horizontal balanced twisted pair cable shall exceed the Category 6A transmission characteristics per issue of ANSI/TIA-568-C.2.
2. Cable jacket shall be CMP rated.
3. Jacket color shall be:
 - a. Green for WiFi.

PART 3 - EXECUTION

3.01 HORIZONTAL CABLES

- A. Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.
- B. A plastic or nylon pull cord with a minimum test rating of 90 Kg (200 lb.) shall be co-installed with all cable installed in any conduit.
- C. Cable raceways shall not be filled greater than the ANSI/TIA-569-B maximum fill for the particular raceway type.
- D. Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.
- E. Where transition points or consolidation points are allowed, they shall be located in accessible locations and housed in an enclosure intended and suitable for the purpose.
- F. The cable's minimum bend radius and maximum pulling tension shall not be exceeded. Refer to manufacturer's requirements.

- G. If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of 48 to 60 inch (1.2 to 1.5 meter) intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.
- H. Horizontal distribution cables shall be bundled in groups of no more than 50 cables. Cable bundle quantities in excess of 50 cables may cause deformation of the bottom cables within the bundle and degrade cable performance.
- I. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
- J. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the Contractor shall install appropriate carriers to support the cabling.
- K. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor prior to final acceptance at no cost to the Owner.
- L. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA-568-C.2 document, manufacturer's recommendations and best industry practices.
- M. Leave a minimum of 12" of slack for twisted pair cables at the outlet. Cables shall be coiled in the in-wall box, surface-mount box or modular furniture raceway if adequate space is present to house the cable coil without exceeding the manufacturers bend radius. Excess slack shall be loosely coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable.
- N. Cables shall be neatly bundled and dressed to their respective termination device. Each terminating device shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- O. Each cable shall be clearly labeled on the cable jacket behind the termination device at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

3.02 IDENTIFICATION

- A. Refer to Section 270553 - Identification for Communications Systems for labeling details.

END OF SECTION 271513

SECTION 271523 – COMMUNICATIONS OPTICAL FIBER HORIZONTAL CABLING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Communications Optical Fiber Horizontal Cabling.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Horizontal Optical Fiber Cable Manufacturer(s)
 - 1. Berk-Tek
 - 2. Mohawk
 - 3. General
 - 4. CommScope
 - 5. Belden
 - 6. No Exceptions

2.02 HORIZONTAL OPTICAL FIBER CABLE

- A. Laser-Optimized 50/125 Multimode Optical Fiber Non-Conductive, Tight Buffered Cable (OM3)

1. Generic Characteristics
2. The indoor optical fiber cable shall be available with up to twelve 900-micron tight-buffered 250-micron fibers placed in a color-coded sub-unit bundle with aramid strength elements.
3. The indoor optical fiber cable shall meet or exceed the performance criteria found in ANSI/TIA-568-C.3.
4. The indoor optical fiber cable shall have sequential length marking printed on the cable jacket.
5. Maximum attenuation dB/Km @ 850/1300 nm: 3.5/1.5
6. Minimum overfilled modal bandwidth: 1500 MHz-km @ 850 nm.
7. Minimum overfilled modal bandwidth: 500 MHz-km @ 1300 nm.
8. Minimum effective modal bandwidth: 2000 MHz-km @ 850nm
9. Cable jacket shall be OFNP rated.
10. Jacket color shall be: Aqua

PART 3 - EXECUTION

3.01 HORIZONTAL CABLES

- A. Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.
- B. A plastic or nylon pull cord with a minimum test rating of 90 Kg (200 lb.) shall be co-installed with all cable installed in any conduit.
- C. Cable raceways shall not be filled greater than the ANSI/TIA-569-B maximum fill for the particular raceway type.
- D. Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.
- E. Riser rated cable shall be installed in metallic conduit when installed in a plenum space.
- F. Where transition points or consolidation points are allowed, they shall be located in accessible locations and housed in an enclosure intended and suitable for the purpose.
- G. The cable's minimum bend radius and maximum pulling tension shall not be exceeded. Refer to manufacturer's requirements.
- H. If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of 48 to 60 inch (1.2 to 1.5 meter) intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.
- I. Horizontal distribution cables shall be bundled in groups of no more than 50 cables. Cable bundle quantities in excess of 50 cables may cause deformation of the bottom cables within the bundle and degrade cable performance.

- J. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
- K. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the Contractor shall install appropriate carriers to support the cabling.
- L. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor prior to final acceptance at no cost to the Owner.
- M. Cables shall be dressed and terminated in accordance with the recommendations made in ANSI/TIA-568-C.0 and/or ANSI/TIA-568-C-1, manufacturer's recommendations and best industry practices.
- N. Leave a minimum of 36" of slack for optical fiber at the outlet. Cables shall be coiled in the in-wall box, surface-mount box or modular furniture raceway if adequate space is present to house the cable coil without exceeding the manufacturers bend radius. Excess slack shall be loosely coiled and stored in the ceiling above each drop location where there is not enough space present in the outlet box to store slack cable.
- O. Cables shall be neatly bundled and dressed to their respective termination device. Each terminating device shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- P. Each cable shall be clearly labeled on the cable jacket behind the termination device at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

3.02 IDENTIFICATION

- A. Refer to Section 270553 - Identification for Communications Systems for labeling details.

END OF SECTION 271523

SECTION 271543 - COMMUNICATIONS FACEPLATES AND CONNECTORS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Communications Faceplates and Connectors.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this Specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Copper Connectivity Manufacturer(s)
 - 1. Leviton – eXtreme Cat 6+
 - 2. Hubbell - NEXTSPEED XCELERATOR 6
 - 3. Panduit - NetKey CAT6 NK688
 - 4. CommScope / Uniprise – UNJ600
 - 5. Belden – REVConnect or KeyConnect cat6+
 - 6. No Exceptions
- B. Approved WiFi Copper Connectivity Manufacturer(s)
 - 1. Leviton – eXtreme 6A
 - 2. Hubbell - NEXTSPEED Ascent Category 6A
 - 3. Panduit - NetKey 6A 10Gig NK6X

4. CommScope / Uniprise – UNJ10G
 5. Belden – REVConnect or KeyConnect 10GX
 6. No Exceptions
- C. Approved Optical Fiber Connectivity Manufacturer(s)
1. Leviton
 2. Hubbell
 3. Panduit
 4. CommScope – Uniprise
 5. Belden FXFusion
 6. No Exceptions
- D. Approved Faceplate Manufacturer(s)
1. Leviton
 2. Hubbell
 3. Panduit
 4. CommScope – Uniprise
 5. Belden KeyConnect
 6. No Exceptions
- E. Approved Surface Mount Box manufacturer(s)
1. Leviton
 2. Hubbell
 3. Panduit
 4. CommScope – Uniprise
 5. Belden KeyConnect
 6. No Exceptions

2.02 COPPER CONNECTIVITY

1. Category 6e, 8-Position, 8-Contact (8P8C) Modular Jack
 - a. The connector module shall exceed the Category 6 performance criteria per ANSI/TIA-568-C.2.
 - b. The eight-position connector module shall accommodate six-position modular plug modular cords without damage to either the cord or the module.
 - c. The connector module shall be designed for use at the work area (WA), communications room (TR) and/or equipment room (ER) without modification.
 - d. The connector module shall be available in both the T568A and T568B wiring configurations within the same module.
 - e. The connector module shall have an insulation displacement connection featuring insulation slicing of 22 to 24 AWG plastic-insulated solid copper conductors forming a gas-tight connection.

- f. Icons shall be used if offered from the manufacturer.
- g. Jack/Icon colors shall be:
 - Black for voice
 - Blue for data
 - Yellow for intercom
 - Gray for video surveillance
 - Green for WiFi

2.03 WIFI COPPER CONNECTIVITY

- 1. Category 6A, 8-Position, 8-Contact (8P8C) Modular Jack
 - a. The connector module shall exceed the Category 6A performance criteria per ANSI/TIA-568-C.2.
 - b. The eight-position connector module shall accommodate six-position modular plug modular cords without damage to either the cord or the module.
 - c. The connector module shall be designed for use at the work area (WA), communications room (TR) and/or equipment room (ER) without modification.
 - d. The connector module shall be available in both the T568A and T568B wiring configurations within the same module.
 - e. The connector module shall have an insulation displacement connection featuring insulation slicing of 22 to 24 AWG plastic-insulated solid copper conductors forming a gas-tight connection.
 - f. Icons shall be used if offered from the manufacturer.
 - g. Jack/Icon colors shall be:
 - Green for WiFi

2.04 FIBER CONNECTIVITY

A. Laser Optimized Multimode Fiber Connectivity OM3

- 1. The optical fiber field-installable connector shall be LC for installation onto multimode a laser optimized 50/125-micron fiber.
- 2. The optical fiber field-installable connector shall be compatible with 900-micron buffered fibers.
- 3. The optical fiber field-installable connector shall meet or exceed the performance criteria found in ANSI/TIA-568-C.3.
- 4. The optical fiber field-installable connector shall have a maximum Loss of 0 .5 dB.
- 5. The optical fiber adapter module that occupies the faceplate shall be equipped with zirconia sleeve.
- 6. Laser optimized connector color shall be aqua.

2.05 FACEPLATES

A. Faceplates

1. The faceplate housing the connector modules shall have no visible mounting screws.
2. It shall be possible to install the connector modules in wall-mounted single- and dual-gang electrical boxes, utility poles and modular furniture (cubicle) access points using manufacturer-supplied faceplates and/or adapters.
3. The faceplate housing the connector modules shall have the option of being mounted on adapter boxes for surface mount installation.
4. The faceplate housing the connector modules shall have a labeling capability using built-in labeling windows, to facilitate outlet identification and ease network management.
5. The faceplate housing the connector modules shall provide flexibility in configuring multimedia workstation outlets that respond to present or future network needs such as audio, video, coaxial and optical fiber applications.
6. Faceplates shall be stainless steel.

2.06 SURFACE MOUNT BOXES

- A. The surface mount box shall accommodate connections of any type, UTP, optical fiber or coax.
- B. The surface mount box shall have internal storage space for slack cabling and a built-in spool for controlling cable bend radius.
- C. Color shall be same as electrical faceplates.

PART 3 - EXECUTION

3.01 COPPER CONNECTIVITY

- A. 8-position, 8-contact (8P8C) modular jacks shall be installed in accordance with manufacturer's recommendations and installation guides, and best industry practices.
- B. Pair untwist at the termination shall not exceed 13 mm (0.5 inch).
- C. Data jacks, unless otherwise noted in Drawings or fiber adapter modules are present, shall be located in the bottom position(s) of each faceplate. Data jacks in horizontally oriented faceplates shall occupy the right-most position(s).
- D. Voice jacks, unless otherwise noted in Drawings, shall occupy the top position(s) on the faceplate. Voice jacks in horizontally oriented faceplates shall occupy the left-most position(s).

3.02 OPTICAL FIBER CONNECTIVITY

- A. Optical fiber connectors shall be installed in accordance with manufacturer's recommendations and installation guides, and best industry practices.
- B. Fiber adapter modules, unless otherwise noted in Drawings, shall be located in the bottom position(s) of each faceplate. Fiber adapter modules in horizontally oriented faceplates shall occupy the right-most position(s).

3.03 FACEPLATES

- A. Blank inserts shall be installed where ports are not used.
- B. The same orientation and positioning of jacks and connectors shall be utilized throughout the installation.
- C. Faceplates shall be installed straight and level.
- D. Faceplates shall be installed at the same heights as electrical faceplates.

3.04 SURFACE MOUNT BOXES

- A. Blank inserts shall be installed where ports are not used.
- B. The same orientation and positioning of jacks and connectors shall be utilized throughout the installation.
- C. Surface mount boxes shall be installed straight and level.
- D. Surface mount shall be installed at heights as electrical receptacles.

3.05 IDENTIFICATION

- A. Refer to Section 270553 - Identification for Communications Systems for labeling details.

END OF SECTION 271543

SECTION 271619 - COMMUNICATIONS PATCH CORDS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Communications Patch Cords.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Copper Patch Cord Manufacturer(s)
 - 1. Leviton – eXtreme Cat 6+ SlimLine
 - 2. Hubbell – NEXTSPEED 6
 - 3. Panduit – NetKey CAT6
 - 4. CommScope / Uniprise – UNC6
 - 5. Belden – CAT6+
 - 6. No Exceptions
- B. Approved WiFi Copper Patch Cord Manufacturer(s)
 - 1. Leviton – eXtreme 6210G
 - 2. Hubbell – NEXTSPEED Ascent 6A
 - 3. Panduit – NetKey 6A 10Gig

4. CommScope / Uniprise – Ultra 10
5. Belden – 10GX
6. No Exceptions

C. Approved Fiber Patch Cord Manufacturer(s)

1. Leviton
2. Hubbell
3. Panduit
4. CommScope – Uniprise
5. Belden
6. No Exceptions

2.02 COPPER PATCH CORDS

A. Category 6e Patch Cords

1. The Category 6e patch cord shall be 4-pair, with 24 AWG stranded copper conductors and 8-position modular plug.
2. The Category 6e modular cord cable shall be UL Listed as Type CMR.
3. The Category 6e patch cord shall exceed the requirements of ANSI/TIA-568-C.2.
4. Lengths shall be 1' as required by the application.
 - a. The Category 6e patch cord color for voice shall be: Purple
 - b. The Category 6e patch cord color for data shall be: Red
 - c. The Category 6e patch cord color for video surveillance shall be: Gray
 - d. The Category 6e patch cord color for intercom shall be: Yellow
 - e. The Category 6e patch cord color for projectors shall be: Blue

2.03 WIFI COPPER PATCH CORDS

A. Category 6A Patch Cords

1. The Category 6A patch cord shall be 4-pair, with 24/26 AWG stranded copper conductors and 8-position modular plug.
2. The Category 6A modular cord cable in data closet shall be UL Listed as Type CMR.
3. The Category 6A modular cord cable in classroom shall be UL Listed as Type CMP.
4. The Category 6A patch cord shall exceed the requirements of ANSI/TIA-568-C.2.
5. Lengths shall be 1' or 5' as required by the application.
 - a. The Category 6A patch cord color for WiFi shall be: Green

2.04 FIBER PATCH CORDS

A. Multimode Fiber Patch Cords

1. 50/125-Micron 850nm Laser Optimized Multimode Fiber Patch Cord (OM3):
 - a. The 50/125-micron fiber used in the multimode fiber patch cord shall have a maximum attenuation of 3.5dB/km@ 850 nm and 1.5 dB/km @1300 nm.
 - b. The 50/125-micron 850nm laser optimized multimode fiber patch cord shall meet or exceed the requirements of ANSI/TIA-568-C.3.
 - c. The optical fiber cord connector shall be LC.
 - d. The multimode fiber cord assembly shall be dual zip jacketed.
 - e. Lengths shall be 1m, 2m, and/or 3m as required by the application.

B. Singlemode Fiber Patch Cords

1. 8.3/125-micron singlemode fiber patch cord (OS2):
 - a. The 8.3/125-micron fiber used in the singlemode fiber patch cord shall have a maximum attenuation of 1.0 dB/km @ 1310 nm and 1.0 dB/km @ 1550 nm.
 - b. The optical fiber cord connector shall have a maximum insertion loss of 0.5 dB and a reflectance of -30 dB.
 - c. The 8.3/125-micron singlemode fiber patch cord shall meet or exceed the requirements of ANSI/TIA-568-C.3.
 - d. The optical fiber cord connector shall be LC.
 - e. The singlemode fiber patch cord assembly shall be dual zip jacketed.
 - f. Lengths shall be 1m, 2m, and/or 3m as required by the application.
 - g. Angle polish connectors shall be used for video distribution.

PART 3 - EXECUTION

3.01 COPPER PATCH CORDS

- A. Copper patch cords shall be installed as per the requirements specified by the manufacturer's installation guidelines.
 1. Provide 1 red patch cord for every computer drop installed.
 - a. Provide a 1 foot patch cord.
 2. Provide 1 blue patch cord for every projector drop installed.
 - a. Provide a 1 foot patch cord.
 3. Provide 1 gray patch cord for every video drop installed.
 - a. Provide a 1 foot patch cord.
 4. Provide 2 green patch cords for every wireless drop installed.
 - a. Provide a 1 foot patch cord for closet side.
 - b. For classroom side provide 5ft plenum patch cord.
 5. Provide 1 yellow patch cord for every intercom drop installed.
 - a. Provide a 1 foot patch cord.

6. Provide 10-7ft yellow patch cords for new MDF & each new IDF.
7. Provide 15-1ft purple patch cords for new MDF & each new IDF.

3.02 FIBER PATCH CORDS

- A. Fiber patch cords shall be installed as per the requirements specified by the manufacturer's installation guidelines.
 1. Provide 1 duplex fiber patch cord for each strand of fiber installed.
 - a. All patch cords to be 3m in length. Unless otherwise stated.

3.03 IDENTIFICATION

- A. Refer to Section 270553 - Identification for Communications Systems for labeling details.

END OF SECTION 271619

SECTION 275113- OVERHEAD PAGING SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS & WORK SPECIFIED ELSEWHERE

- A. Applicable requirements of Division 27 - Communications shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to Overhead Paging System requirements.
- C. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and on the drawings.
- D. The conditions of the General Contract (General, Supplementary, and other Conditions) and the General Requirements are hereby made a part of this Section.
- E. All bids shall be based on the expansion of the existing district's Intercommunication and Bell Schedule Systems and must be compatible with the current Rauland-Borg Systems - No Exceptions. Equipment as specified herein. The catalog numbers and model designations are that of the Rauland Borg.
- F. The work in this section is related to the work specified in the following sections: Section 160000 - Basic Materials and Methods – section 270000 data/networking.
- G. The drawings and general provisions of the Contract Documents apply to this Section.
- H. Integration of the intercommunications system to the school district's telephone system. (SIP TO SIP INTEGRATION)
- I. Interconnect the fire alarm system to the intercommunications system such that upon activation of any initiating device, a preset audible alarm will be sent to all intercom speakers. In addition, the contractor shall furnish and install all controls necessary between the two systems such that upon silencing the alarm on the fire alarm panel, it automatically silences the MPEG file in the intercom system.
- J. Interconnect the Lynx Emergency system to the intercommunications system such that upon activation of any initiating device, a preset audible alarm will be sent to all intercom speakers, Also, the contractor shall furnish and install all controls necessary between the two systems such that upon silencing the alarm through the system, it automatically silences the alarm in the intercom system.
- K. Not included in this Section – The owner and/or data network contractor shall provide: Racks, Cable Management, PoE Switches, UPS and/or Emergency Power, Patch Panels, Patch Cables and Data Cabling from the MDF and IDF(s) to each data cable drop in the

classroom or office. The data cable drop must be terminated with a 5 ft. service loop above the ceiling grid at each location shown on the drawing. Each data cable drop shall be labeled at both ends and tested. Provide fifteen (15) rack units of space in each MDF and IDF for communications equipment in the new additions and existing building.

- L. The communication contractor shall provide Patch Panels, Patch Cables, and Data Cabling from the MDF and IDF(s) to each data cable drop in the classroom or office. The data cable drop must be terminated in the middle of the room in each location shown on the drawing. Each data cable drop shall be labeled at both ends, patch panel, ceiling tile grid next to the speaker and tested. A service loop of five feet from the top of the grid for classroom and offices. Cable color shall meet the Gwinnett County Public School standards.

1.02 SUMMARY

- A. This section includes a fully operational IP platform for a district-wide and internal school communications system incorporating school safety notifications and general communications including but not limited to, the following: The platform shall provide complete internal communications employing state of the art IP Technology, including the minimum functions listed.
 - 1. Two-way internal intercommunications between staff locations and classrooms.
 - 2. Scheduled bell events.
 - 3. An emergency announcement that will override any pre-programmed zones assuring that all Emergency/Lockdown/Etc. are heard at each speaker location.
 - 4. The capability of prerecording emergency announcements that can be activated by a simple Soft Key or via a dedicated push button.
 - 5. Atomic Time Synchronization with Class Change Tones utilizing multiple, programmable schedules for each zone.
 - 6. District wide emergency, group, all school, and zone live voice paging.
 - 7. District wide emergency, group, all school, and zone paging for pre-recorded audio tones, music and voice.
 - 8. Web-based user interface.
 - a. The system shall support a minimum of 1000 level priorities, which shall be user-definable, allowing each end point to place a minimum of 5 different priority calls at the same time.
 - b. Any authorized administrator shall be able to call from outside the school into any classroom, zone, or the entire school directly via the School District supplied SIP (Session Initiation Protocol) enabled Telephone Network. This shall allow remote monitoring, call-in annunciation and two-way conversation from outside the facility as well as paging into the system. Compliance with NEMA Standard SB-40 for emergency communications in K-12 Schools.
 - c. Authorized system users shall be able to create a minimum of twenty (20) automated sequences with emergency instructions, tones, e-mails, and relay activations and replay them.

- d. Automated message strings shall be manually initiated from single-button access on the console, on a SIP connected telephone, a panic button, from the web interface or via an interface with third-party systems.
- e. Paging and two-way intercom features shall be accessible from any system console or SIP connected telephone for each campus.
- f. The platform shall synchronize its system time to the network timeserver or a web-based time server.
- g. Each single campus installation shall be locally survivable for intercom, paging, bells, and emergencies such as lockdown, even when the district connection is unavailable.
- h. This specification establishes a minimum level of quality, features, and performance for individual components as well as the integrated system.

1.03 DEFINITION OF TERMS

- A. Installer(s): Shall refer to the person, persons or company who or which contracts to perform the work specified herein.

1.04 SUBMITTALS

- A. Product data for each component.
 - 1. Shop Drawings: Prior to proceeding with the work, provide detailed equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components and location of each field connection and a complete schedule of all equipment and materials with associated manufacturers cuts sheets which are to be used. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Identify terminals to facilitate installation, operation and maintenance. Artwork drawings and lists are indicating proposed nameplate nomenclature and arrangements for control panels and plug panels prior to fabrication reflecting equipment used. Each drawing shall have a descriptive title and all sub-parts of each drawing shall be labeled. All drawings shall have the name and locations of the project, Systems Contractor's name in the title block. Details and descriptions of any other aspect of the system, which must differ from the contract documents due to field conditions or equipment furnished.
- B. FCC Approval: The system shall be approved for direct interconnection to the telephone utility under Part 68 of FCC rules and regulations. Systems that are not FCC approved or utilized as an intermediary device for connection will not be considered. Provide the FCC registration number of the system being proposed as part of the submittal process.
- C. Product Certificates: Signed by manufacturers of equipment certifying that products furnished comply with specified requirements.
- D. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

- E. Manufacturer Certificates: Signed by manufacturers certifying that they comply with requirements.
- F. Maintenance Data: For equipment to be included in maintenance manuals specified in Division 1.
 - 1. Record of Owners' equipment-programming option decisions.
 - 2. All instructions necessary for proper operation and manufacturer's instructions.
 - 3. "Proof of Performance" information.
 - 4. Manufacturer's maintenance information.
 - 5. Copies of non-proprietary computer programs and system set up disks documenting all programmable features of the installed system.
- G. Record Drawings: Prior to final acceptance, provide three (3) complete sets of drawings indicating all cable numbers and construction details in accordance with the actual system installation. Revise all shop drawings to represent actual installation conditions. These Record Drawings will be used during "Final Acceptance Testing."
- H. System Training: Submit the following information describing the training programs and system trainers as outlined in paragraph 1.6 of this specification and under Division 1 specifications. (12 hours of training 3 site visits within the first year of operation)
 - 1. Include a preliminary staff development training program in the outline form for review and approval by the owner's representative.
 - 2. Include a current copy of the trainer's certification from the manufacturer that certifies and identifies the trainer(s) who are eligible to provide training and support for the project.
 - 3. Include a current copy of the trainer's need's assessment form which will be reviewed with the owner's designated representative for the system's preliminary system programming and configuration.
 - 4. Include copies of all documentation used to identify for the owner those participants attending and completing the training programs.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is an authorized representative of equipment manufacturer for both installation and maintenance of equipment required for this Section. Provide the following within thirty (30) days after notification to proceed:
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- C. Comply with NFPA 70
- D. Comply with NEMA Standard SB-40 for Emergency Communications in K-12 schools.
- E. Comply with UL 60950.

1.06 IN-SERVICE TRAINING

- A. The contractor shall provide and implement a complete and comprehensive staff training program for all administrators, facility staff members and teachers. This mandatory training program will provide school staff with a full understanding of how to utilize and adequately operate all functions.
- B. The training program shall be implemented by a staff member/trainer employed by the contractor. The trainer must be factory certified to provide training on their product.
- C. All staff development training is to be coordinated through the owner's designated representative. As training sessions are completed, the trainer will provide the school's administrative staff and school district's staff a document listing all of the team and faculty members who attended, received and completed the training program.

1.07 WARRANTY

- A. Provide a manufacturer's five-year warranty of the school communications network equipment against defects in material and workmanship. This warranty will cover all electronic equipment, as well as speakers, clocks, any field devices and call-in switches. If any defects are found within the warranty period, the defective equipment shall be replaced at no cost. Five years warranty shall be provided for labor.
- B. The statement of the warranty shall be provided on the manufacturer's stationery. The standard five-year warranty is an essential element in establishing a standard in quality. Manufacturers who circumvent the five-year warranty by offering special "extended warranties" that are not part of their standard published warranty will not be accepted.
- C. The contractor shall respond, excluding weekends and holidays, within 24 hours to any warranty service calls. If equipment cannot be repaired within 24 hours of the service visit, the contractor shall provide "loaner" equipment to the facility at no charge.
- D. Make available a service contract offering continuing factory authorized service of the system after the initial warranty period.

1.08 ACCEPTACLE MANUFACTURERS

- A. The equipment model numbers specified herein are that of the Rauland. The intent is to establish a standard of quality, the standard of equipment function, and features. It is the responsibility of the bidder to ensure that the proposed product meets or exceeds every standard set forth in these specifications. Failure to provide the identical functions of the existing district wide integrated communication system will result in the removal of the system at the end of the project and replace it at the contractor expense.
- B. The functions and features specified are vital to the operation of this facility; therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification

1. Telecenter U Campus IP Edition manufactured by Rauland-Borg Corp.

PART 2 - PRODUCTS

2.01 SYSTEM REQUIREMENTS

- A. The platform shall utilize state of the art IP Technology for Call-in Notification, School Safety Paging, and Evacuation Tones, Atomic Time Synchronization, Class Change Tones utilizing multiple, programmable schedules for each zone. Two-way hands-free Internal Intercommunications, Paging and Program Distribution. The system shall be easy to learn and operate. All standard programming shall be web-based and user-friendly to allow the system administrator the ability to program system features easily.
- B. Provide a complete and satisfactorily operating district/school communications and district/school safety system as described herein, using materials and equipment of types, sizes, ratings, and performances as indicated. Use materials and equipment that comply with referenced standards and manufacturers' standard design and construction, in accordance with published product information. Coordinate the features of all materials and equipment so they form an integrated system, with components and interconnections matched for optimum performance of specified functions.
- C. The platform shall be a single electronic system consisting of a minimum of 10 intercom channels for each campus, (classroom) IP speaker modules and call-in switches, IP Zone Modules connecting corridor speakers, inside and outside horns, IP Administrative Consoles, SIP-enabled PBX integration and district-wide integration for paging, emergency notifications, calendar scheduling and configuration.
- D. Each Classroom shall be provided with an IP Speaker module interface and up to 5 different call-in switches, each with their annunciation path and priority. The ability to monitor the is device the operation and report via e-mail or text any failures.
- E. Call-ins may automatically annunciate (display of priority and location) to administrative consoles, and SIP enabled phones and outside phones.
- F. Call-ins shall be programmed to automatically change priority and annunciation route based on the age of call-in and priority.
- G. Call-ins may have priority and annunciation routing changed by user action from a console or SIP-enabled phone.
- H. Call-in annunciation routing shall include playing pre-recorded audio over speakers, sending a pre-configured e-mail and activating relays.
- I. The platform shall lend itself to expansion by the simple addition of hardware modules.

- J. The platform shall directly connect to the WAN/LAN without the need for a separate server at each school location. Configuration, including bell schedules, calendars, and emergency sequences, can remotely be created, changed, stored and downloaded to the system by an authorized user from a browser-based interface.
- K. The platform shall provide the ability to initiate school safety paging announcements, evacuation tones and take cover tones from any telephone or connected web-browser within the facility or outside the facility to any other location within the facility or district.
- L. The platform shall provide the ability to selectively communicate or monitor individual classrooms in emergency situations from any telephone within the facility or outside the facility to any other location within the facility. All communication within the classroom shall be hands free and will not require any interaction by the classroom user.
- M. The platform shall provide classroom users the ability to confirm that they have safely secured their classrooms during lockdown with a single button press.
- N. IP-addressable and POE powered speaker modules for individual rooms shall be system programmable and may be assigned any two, three, four, five or six-digit number as well as name and description. Any extension may be reassigned at any time.
- O. IP-enabled two-way voice communication shall be available from any provided telephone or administrative console through any IP Speaker on a campus. This shall allow hands-free communication to any classroom or any individual IP loudspeaker unit. A programmable pre-announce tone shall sound immediately before the intercom path is opened and a supervisory tone shall continue to sound at regular intervals when speaker monitoring is active, complying fully with all privacy legislation. Pre-announce tone and supervisory tones shall be disabled during designated emergencies, such as lockdowns, automatically.
- P. The platform shall allow users to configure multiple schedules per school, with a minimum of 500 unique events per the schedule and automatic Daylight Savings Time correction. A minimum of 5 schedules may be active on any given day for each campus. Users shall be able to select from 25 standard included tones as well as unlimited user created and uploaded audio files for class change signaling and messaging. In addition, scheduled events shall consist of relay actions, e-mail notifications and paging exclusions as system configuration changes. The platform shall allow control of the bell schedules via the district WAN/LAN without the need for a separate server at each school location. Bell schedules can be remotely created, changed, stored and assigned to calendar days for the local school by an authorized user from a browser-based interface.
- Q. The platform shall allow users to configure multiple schedules per school, with a minimum of 500 unique events per the schedule and automatic Daylight Savings Time correction. A minimum of 5 schedules may be active on any given day for each campus. Users shall be able to select from 25 standard included tones as well as unlimited user created and uploaded audio files for class change signaling and messaging also, as system configuration changed. The platform shall allow control of the bell schedules via the district WAN/LAN without the need for a separate server at each school location. Bell

schedules can be remotely created, changed, stored and assigned to calendar days for the local school by an authorized user from a browser-based interface.

- R. The platform shall be able to integrate with an existing PA system or operate as a fully independent IP solution. The platform shall be able to function in the combination of said configurations and allow for seamless communication within a school or district-wide, regardless of the type of setup used. The platform shall be scalable, with the ability to easily add, install, and configure additional equipment to a system.
- S. The platform allows for customization of preprogrammed sequences, used for emergencies, events, and everyday communications. Preprogrammed sequences can be activated from the push of a relay button, soft key of an administrative console, a dial string of a SIP phone, or a web browser configured to the district network. Sequences can be initiated automatically as part of a schedule or on the fly. Preprogrammed sequences can be customized to utilize any combination of audio tones, emails, relays, tone exclusions, swings, delays, duplex, SIP phone notifications, and program distribution. Audio tones can include customized audio files and voice messages recorded in any language. Uploaded audio tones and messages can be preprogrammed to announce repeatedly or individually, as part of a scheduled sequence or on the fly. Each school in a district can have its customized sequences and can be activated separately, in groups, or district wide.
- T. The platform allows for emergencies to be initiated in a drill environment, separate from real emergencies. Drill emergencies can be initiated from panic buttons, consoles, SIP phones, or a web browser.

2.02 EQUIPMENT & MATERIALS

- A. Server Software – Rauland Model TCC2000SW (Existing at District) 6.1 SERVICE PAC 2
 - 1. Provides district-wide paging, bell event scheduling, emergency notification, and configuration for the entire district.
 - 2. It provides the ability to configure the system and initiate system features per school and district-wide from a web-based interface.
 - 3. The software can sync system time to the Atomic Clock Signal or to the school's or district's network time server.
 - 4. The software will provide a web-browser to deliver district-wide emergency paging, pre-recorded messages and tones from any authorized computer in the facility or the district. The software must be capable of automatically notifying district personnel via the WAN of an alarm condition.
 - 5. The software can automatically broadcast emergency instructions via associated system hardware throughout an entire district when an alarm (e.g., lockdown, lockout, security, fire) is initiated via the web-based interface. The emergency instructions are preprogrammed and require no user intervention. The system provides redundant alarm annunciation over intercom/paging speakers and is not meant to replace primary fire alarm or security systems.
 - 6. The software can be installed in cloud, virtual, or physical server environments.

7. The web-based user interface supports secure HTTP browsing.
8. The server software supports encryption to ensure secure access.
9. The software shall support any combination of VoIP Telecenter U Campus Controllers for a minimum of 1000 facilities.
10. The software shall support a minimum of 50,000 IP Speaker Modules district wide.

B. VoIP Single Campus Controller – Rauland Model TCC2000

1. Provides call routing for paging and intercom for a single facility
2. Connects to the district provided Telephone Network via a SIP connection.
3. Supports a flexible numbering plan allowing two, three, four, five- or six-digit extensions.
4. SIP interface to a district provided Telephone Network shall enable connected phones to display classroom call-ins, answer internal intercom call-ins, make pages, and change priorities of call-ins in progress...
5. Direct Dialing, two-way amplified voice intercom between any provided telephone or administrative console and IP speaker without the use of a press-to-talk or talk-listen switch.
6. Ability to place two levels of call-in from any call-in switch.
7. The ability to answer intercom call-ins registered at administrative consoles and pre-selected telephones.
8. The ability to automatically escalate incoming call-ins to an alternate telephone or group of telephones if they remain unanswered for a predetermined amount of time.
9. The ability to manually upgrade an intercom call-in to an alternate telephone or group of telephones.
10. The ability for classrooms to “check-in” via push-button when they have successfully secured their location during an emergency.
11. Administrative console shall display locations that have not “checked-in” to confirm their secured location and provide hands-free audio monitoring and communication to unsecured locations.
12. The controller shall not need a direct connection to any classroom via home run or distributed wiring. It shall communicate solely through the IP Network.
13. Single-button access from any telephone on the system to distribute emergency announcements within the facility to all or select locations equipped with speakers. Emergency announcements originating from any assigned administrative phone shall have priority over all regular system functions.
14. Ability for administrative consoles and connected phones to selectively monitor audio at any two-way speaker during an emergency.
15. Stores a minimum 48 hours of Bell Event Schedules, all emergency notification sequences as well as facility wide configuration.
16. The system can sync system time to the Atomic Clock Signal or the school’s or district's network time server.

17. System's SIP Interface shall provide:
 - a. Audio paging access from any telephone to any single intercom speaker, zone (group) of intercom/paging speakers or all speakers/paging horns throughout the entire facility.
 - b. Ability to answer a call-in directed to that SIP extension.
 - c. Ability to upgrade a call-in directed to that SIP extension
 - d. Single-button access from any telephone on the system to initiate alarm signals within the facility to all or select locations equipped with speakers. A minimum of 25 separate distinct alarm signals shall be provided. Alarm signals originating from any assigned administrative telephone shall have priority over all regular system functions.
 - e. Ability to initiate school-wide emergencies, including lockdown and evacuate sequences.
18. The system will have the ability to utilize a web-browser and a USB microphone connected to the PC to deliver district-wide live emergency paging, pre-recorded messages and tones from any authorized computer in the facility or district. The system must be capable of automatically notifying district personnel via the WAN of an alarm condition.
19. The system can automatically broadcast emergency instructions throughout an entire campus when an alarm (e.g., lockdown, lockout, security, fire) is tripped or manually activated. The emergency instructions are preprogrammed and require no user intervention. The system provides redundant alarm annunciation over intercom/paging speakers and is not meant to replace primary fire alarm or security systems.
20. IP Addressable Modules: - 1. The system shall provide multiple IP addressable modules for intercom, paging, and relay activation.
 - a. All modules are POE 802.3af compliant.
 - b. All Modules support DHCP
 - c. All Modules connect to the network with a single RJ-45 connector

C. IP Addressable Speaker Module – Rauland Model TCC2011A

1. Speaker modules shall interface classroom devices, such as speakers and call-in switches, to provide a reliable communications link to the administrative consoles and connected phones utilizing the school's data network. Capable of delivering a full 2 Watts of audio power to an 8 Ohm speaker, the speaker module provides excellent audio coverage for all K-12 classrooms. The speaker module can be easily programmed through the web browser's volume slider interface to adjust the audio power (0.25W, 0.5W, 1W, 1.5W, and 2W) to each 8 Ohm speaker.
2. Speaker modules shall be equipped with an SPST relay that can trigger a visual indicator, such as a strobe, whenever a high-priority audio signal is present.

3. Speaker modules may belong to one or more of a minimums of 100 independent zones for zone paging, program/music distribution, and class change tone reception; this assignment is a programmable function, changeable by the time of day. Each IP Speaker Modules location shall be programmed in software to belong to any combination of software zones. IP Speaker Modules shall be designed to mount to ceiling and wall speakers specified herein and in the plenum space.
- D. IP Addressable Zone Paging Module – Rauland Model TCC2022
1. Zone paging modules convert the IP-based audio to an analog line-level audio signal to drive the Audio/Program Amplifiers specified herein.
 2. Zone paging modules shall connect multiple speakers for district all page, all page, zone paging, bells, audio events, and emergency notifications.
 3. Zone paging modules shall be rack mounted in the MDF/IDF's using the Rauland Model TCC2099 Universal Rack Mounting Kit.
 4. Zone paging modules shall be able to belong to one or more of 100 independent zones for live paging, bells, pre-recorded audio and emergency notifications.
- E. IP Addressable Auxiliary Input/output Module – Rauland Model TCC2033
1. Auxiliary I/O Modules provide two (2) network enabled, individually addressable contact closures providing an interface to external systems such as fire alarm panels, security panels, strobes, and door latches.
 2. Auxiliary, I/O modules provide the ability to connect a “Panic Button” to the system.
 3. Auxiliary I/O Modules shall be rack-mounted using the Rauland Model TCC2099 Universal Rack Mounting Kit.
 4. User can program relays to be activated manually, through an event/bell schedule and during emergency notification.
- F. IP Addressable Program Line Input Module – Rauland Model TCC2055
1. Line Input Module converts stereo or mono line-level analog audio to IP-Based Data for use in the Telecenter U system.
 2. It is equipped with 3.5mm (headphone style) input socket.
 3. Desktop or rack is mountable with Rauland Model TCC2099 Universal Rack Mounting Kit.
 4. Includes a male 3.5mm to dual male RCA connector cable.
- G. Audio Paging/Program Amplifier(s)
1. The power amplifier(s) shall be provided to provide a minimum of 2 watts of power to all paging speakers and 15 watts of power to all paging horns.
 2. The maximum load on the paging/program amplifiers shall be 80% of the rated maximum output of the amps.
 3. Provide JBL CSA-Series to meet the above requirements.

- H. IP Addressable Administrative Console – Rauland Model TCC2045
1. A full-color screen with 64 soft keys, 3 lines select, volume control, push to talk, speakerphone mode, left/right and up/down scrolling.
 2. Audio paging access from any Console to any single intercom speaker, zone (group) of intercom/paging speakers or all speakers/paging horns throughout the entire school.
 3. Programmable soft key access from any console on the system to initiate alarm signals within the school to all or select locations equipped with speakers. A minimum of 25 separate distinct alarm signals shall be provided. Alarm signals originating from any assigned administrative telephone shall have priority over all regular system functions.
 4. Programmable soft key access from any console to automatically broadcast page emergency instructions throughout an entire school when an alarm (e.g., lockdown, lockout, security, fire) is tripped or manually activated. The emergency instructions are preprogrammed and require no user intervention. The system provides redundant alarm annunciation over intercom/paging speakers and is not meant to replace primary fire alarm or security systems.
 5. Ability to perform intercom communication with any single IP Addressable Speaker Module.
 6. Ability to display 3 call-ins at a time on the screen, with an unlimited number of call-ins annunciating and the ability to scroll to view all call-ins.
 7. Ability to upgrade a call-in via a soft key.
 8. Programmable soft key access from any console for activating relays, campus-wide.
 9. Ability to maintain, along with controller and other IP Modules system functions, including intercom, bells, and paging for the local campus in the event of district-wide connection loss.
- I. Check-in/Emergency Dual Pushbutton Call-in Switch – Rauland Model TCC2211PB (shall provide a monitor of call button status)
1. Check-in/Emergency Call-in Switches indicated on the drawings shall contain the following functions and features:
 - a. One (1) “Check-in” call-in switch that shall activate a distinctive “NORMAL” call annunciation from single button activation under non-emergency conditions and shall activate a “Check-in” annunciation to confirm the location is secured during lockdown conditions. The button shall be blue in color and shall be marked “CHECK IN” and will route the call-in to any one or more Administrative Telephones and Displays for a quick and easy response from an Administrative Telephone.
 - b. One (1) “Emergency” call-in switch that shall activate a distinctive “EMERGENCY” level call from single button activation. The button shall be red in color and shall be marked “EMER” and will route the call-in to any one or more Administrative Telephones for quick and smooth response. Provide as indicated on the drawings.

- J. Tile Ceiling Mounted Intercom Speaker – Rauland Model BAFKIT2X2L8RJ
1. Shall be a pre-assembled 2 foot by 2-foot lay-in speaker, baffle and back box assembly consisting of a premium 8 Ohm, 8” speaker, a perforated steel baffle with a white baked epoxy finish and an integrated back box that covers the full area of the baffle.
 2. The speaker assembly shall include a female RJ-45 modular socket and mounting bracket to facilitate connection to the TCC2011A IP Speaker Module specified herein. Provide as indicated on drawings.
- K. Gypsum Ceiling Mounted Intercom Speaker Assembly – Rauland Model ACC1480
1. Shall consist of a premium 8 Ohm, 8” loudspeaker mounted on a 12-7/8” round white epoxy steel baffle. The recessed ceiling back box shall be an 8” round enclosure with a plaster flange mounting ring and a depth of 4-1/8” (Rauland Model ACC1110).
 2. The speaker assembly shall include a female RJ-45 modular socket and mounting bracket to facilitate connection to the TCC2011A IP Speaker Module specified herein. Provide as indicated on drawings.
- L. Ceiling Mounted Intercom Speaker Assembly – Rauland Model ACC1406
1. The ACC1406 25V Speaker Assembly consists of a high efficiency USO188 8” loudspeaker complete with a 25V line matching transformer, mounted on a round, steel, white baffle (ACC1000), which can be attached to an ACC1100, ACC1101, ACC1103.
- M. Tile Ceiling Mounted Speaker – Quam Model Solution 5
1. The SOLUTION 5 is a complete, shallow depth, lightweight, 2' x 2' ceiling tile replacement loudspeaker pair consisting of a primary and secondary unit, for use in larger environments where more than a single 8 Ohm unit is required for proper coverage with a single 8 Ohm source.
 2. Average Sensitivity- 92 dB SPL, 1W/1M, Loudspeaker Power Rating - 12W RMS EIA 426A Standard, Maximum Power Rating - 15W @ 8 Ohms (pair), Calculated Output - 102 dB-SPL 12W/1M, Frequency Response - 65 Hz - 17 kHz EIA 426A Standard and Audio Connection - RJ45.
 3. The speaker assembly shall include a female RJ-45 modular socket and mounting bracket to facilitate connection to the TCC2011A IP Speaker Module specified herein. Provide as indicated on drawings.
- N. Tile Ceiling Mounted Paging Speaker – Rauland Model BAFKIT2X2L
1. Shall be a pre-assembled 2 foot by 2-foot lay-in assembly complete with 8” full-range speaker, 25Volt line matching, rotary-select tap transformer, perforated steel baffle with a white baked epoxy finish and an integrated back box that covers the full area of the baffle.

2. The speaker assembly shall have a pair of speaker wires through a hole suitable for a $\frac{3}{4}$ " conduit fitting as the connection point for twisted/shielded cabling to the Audio Paging/Program Amplifiers specified herein. Provide as indicated on the drawings.
- O. Tile Ceiling Mounted Paging Speaker with Volume Control – Rauland Model BAFKIT2X2LVC
1. Shall be a pre-assembled 2 foot by 2-foot lay-in assembly complete with 8" full-range speaker, 25/70Volt line matching transformer, perforated steel baffle with a white baked epoxy finish and an integrated back box that covers the full area of the baffle.
 2. The speaker assembly shall have a pair of speaker wires through a hole suitable for a $\frac{3}{4}$ " conduit fitting as the connection point for twisted/shielded cabling to the Audio Paging/Program Amplifiers specified herein.
 3. The front panel accessible volume control permits the end-user to adjust the loudness of the speaker to a comfortable level. Provide as indicated on the drawings.
- P. Gypsum Ceiling Mounted Paging Speaker Assembly – Rauland Model ACC1406
1. Shall consist of a high-efficiency loudspeaker (Rauland Model US0188) complete with a 25/70 Volt multi-tap line matching transformer mounted on a round white epoxy steel baffle (Rauland Model ACC1000). The recessed ceiling back box shall be an 8" round enclosure with a plaster flange mounting ring and a depth of 4-1/8" (Rauland Model ACC1110). Provide as indicated on the drawings.
- Q. Paging Speaker – Rauland Model US0188
1. Shall be an 8" permanent magnet seamless cone type with an additional cone provided to extend high-frequency response. It shall have a frequency range of 65-17,000Hz, an 8-watt program power-handling capacity and an axial sensitivity of 93db at 1 watt with a 1-watt input. Voice coil shall be $\frac{3}{4}$ " diameter with an impedance of 8 Ohms. The speaker shall be equipped with a multi-tap transformer (0.312, 0.625, 1.25, 2.5 and 5 watts) at 25V and 70V.
 2. The recessed back box shall be of heavy gauge cold-rolled steel, spot welded for stability with a rust-retardant gray primer finish. Acoustically treat the interior to eliminate mechanical resonance. The backbox shall be 10-3/4" square by 3.75" deep (Lowell Model P68X).
 3. The baffle shall be constructed of 22-gauge cold-rolled steel that is zinc-treated to resist corrosion. The finish is baked, powdered white epoxy, which is virtually scratch- and mar-proof. (Model SG8-VP). Provide as indicated on the drawings.

- R. Paging Speaker – Rauland Model 0880
1. Shall be an 8” permanent magnet seamless cone type with an additional cone provided to extend high-frequency response. It shall have a frequency range of 65-17,000Hz, an 8-watt program power-handling capacity and an axial sensitivity of 93db at 1 watt with a 1-watt input. Voice coil shall be 3/4” diameter with an impedance of 8 Ohms. The speaker shall be equipped with rj45 jack.
- S. Surface Ceiling Mounted Paging Speaker – Rauland Model US0188
1. Shall be an 8” permanent magnet seamless cone type with an additional cone provided to extend high-frequency response. It shall have a frequency range of 65-17,000Hz, an 8-watt program power-handling capacity and an axial sensitivity of 93db at 1 watt with a 1-watt input. Voice coil shall be 3/4” diameter with an impedance of 8 Ohms. The speaker shall be equipped with a multi-tap transformer (0.312, 0.625, 1.25, 2.5 and 5 watts) at 25V and 70V.
 2. The surface backbox shall be 18-gauge cold-rolled steel with an attractive white epoxy finish. The interior surfaces are jute-lined to prevent metallic resonance, vibration and provide proper acoustical results. The backbox shall be 12-1/2” square by 4” deep (Lowell Model CB84-SGVP).
 3. The baffle shall be constructed of 22-gauge cold-rolled steel that is zinc-treated to resist corrosion. The finish is baked, powdered white epoxy, which is virtually scratch- and mar-proof. (Lowell Model SG8-VP). Provide as indicated on the drawings.
- T. Recessed Wall Mounted Exterior Paging Speaker Assembly – Lowell Model P68X or Rauland Model ACC1112.
1. The speaker shall be an 8" single cone driver with a moisture-resistant cone and a 10 oz. magnet. The cone is cotton cloth with a phenolic resin treatment and a double-dipped acrylic lacquer coating to provide superior protection in areas of high humidity. The speaker shall be Lowell Model 8C10MRB-T72. The recessed back box shall be of heavy gauge cold-rolled steel, spot welded for stability with a rust-retardant gray primer finish. Acoustically treat the interior to eliminate mechanical resonance. The backbox shall be 9.6” square X 3.75” deep. The baffle shall be vandal-proof, the faceplate constructed of a special aluminum alloy with a tensile strength of 44,000PSI. The baffle front is backed with a heavy gauge, perforated steel screen which protects the speaker. Provide tamper-resistant hardware. The Baffle shall be Lowell model SG8-VP. Provide as indicated on the drawings.

- U. Surface Exterior & Canopy Mounted Paging Speaker Assembly - Lowell model CB84-SGVP
1. The speaker shall be an 8" single cone driver with a moisture-resistant cone and a 10 oz. magnet. The cone is cotton cloth with a phenolic resin treatment, and a double-dipped acrylic lacquer coating to provide superior protection in areas of high humidity. The speaker shall be Lowell Model 8C10MRB-T72. Provide as indicated on drawings. The recessed back box shall be of heavy gauge cold-rolled steel, spot welded for stability with a rust-retardant gray primer finish. Acoustically treat the interior to eliminate mechanical resonance. The surface backbox shall be 11.5" square X 4" deep. The grille shall be 14-gauge steel, with a secondary steel barrier constructed of 22-gauge steel screen which protects the speaker. Provide tamper-resistant hardware.
- V. High-Security Intercom Station - Quam Model CIS2/8
1. Shall be designed to provide two-way intercom functions in areas where high ambient noise levels are present. Two-way communications are accomplished through the use of the built-in speaker/microphone. A call origination switch is provided within the station. Quam Model CIS2/8. Provide as indicated on the drawings.
 2. The speaker assembly shall include a female RJ-45 modular socket and mounting bracket to facilitate connection to the TCC2011A IP Speaker Module specified herein. Provide as indicated on drawings. Rauland Modell ACC1119 Surface backbox.
- W. Surface Mounted Wall Speaker Assembly – Lowell BSG-8 Bi-Directional Wall Baffle
1. The bi-directional surface baffle for use with one 8 in. driver (not included) shall be Lowell Model No. BSG-8. The box shall be fabricated of 20-gauge steel (11.563 in. square x 4.250 in. projection) with two pre-mounted grilles, one front, and one rear. The assembly shall have a white powder epoxy finish.
 2. Material: Precision formed 20-gauge steel with welded corners
 3. Grille: Two pre-mounted steel grilles with welded speaker studs – White
 4. Size: 11.563 in. square x 4.250 in. deep
 5. Mounting Aids: Side opening for wire access (2 in. square) and punched to flush mount a standard E.O. b
- X. Remote Audio Input Jack Plate - ProCo Model Type A
1. Provide a single gang plate in the office area to facilitate the connection of a headphone level audio source for a broadcast of program material through the system (ProCo Model Type A). The jack plate shall have a single 3.5mm female stereo input. The jack plate shall be engraved "INTERCOM PROG. INPUT".

- Y. Paging Horn Wide-Angle – Rauland Model 3603 with A30G Weather Adaptor
1. The Rauland 3603 paging project is a compact, wide-angle type loudspeaker which provides maximum intelligibility over large areas. Its durable, attractive non-resonant heavy-duty ABS resin horn and die-cast aluminum mounting make it ideal for application in either indoor or outdoor sound, signaling and intercommunication systems. Excellent for use in warehouses, storage yards, athletic fields, or wherever a completely weatherproof wide-angle loudspeaker is required.
 2. The paging projector(s) shall be a Rauland 3603 or approved equal wide-angle paging projector. It shall have an integrated driver assembly combined with a double re-entrant, non-resonant heavy-duty ABS resin horn. It shall contain a built-in, weatherproofed 25- and 70-volt line matching transformer and shall be provided with a screwdriver adjustable impedance-wattage switch.
 3. Power taps shall be available as follows: 70-volt line: 1.8, 3.7, 7.5, 15, 30 watts
25-volt line: 1.8, 3.7, 7.5, 15 watts
 4. The loudspeaker driver assembly shall have a heavy-duty magnet, and a self-aligning, field replace-able diaphragm. Power handling capacity shall be 30 watts at full range and produce 107dB at 1-meter on axis with 1-watt input. Frequency response shall be 225 to 14,000 Hz. Dispersion shall be no less than 120° horizontal and no greater than 60° vertical.
- Z. Bus/Car Ryder Paging Telephone – Grandstream 750 and DP720 Handset – Elementary and Middle School application. No exceptions.
- AA. Cabling: Must meet all specifications as outlined in the data and cabling portion of the specifications. SWC will install the field devices cabling from the data drop.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine conditions, with the Installer present, for compliance with requirements and other conditions affecting the performance of the School Communications and School Safety Network.
- B. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Install the system following NFPA 70 and other applicable codes. Install equipment following the manufacturer's written instructions.
- B. Furnish and install all material, devices, components, and equipment for a complete and operational system.

- C. Impedance and Level Matching: Carefully match input and output impedance's and signal levels at signal interfaces. Provide matching networks where required.
- D. Control Circuit Wiring: Install control circuits following NFPA 70 and as indicated. Provide number of conductors as recommended by the system manufacturer to provide control functions indicated or specified.
- E. All housings are to be located as indicated.
- F. The contractor shall provide necessary transient protection on the AC power feed, all copper station lines leaving or entering the building, and all central office trunks. All protection shall be as recommended by the equipment supplier and referenced to earth ground.
- G. Wiring within Enclosures: Provide adequate length of conductors. Bundle, lace, and train the conductors to terminal points with no excess. Provide and use lacing bars.
- H. Provide physical isolation from speaker-microphone, telephone, line-level wiring and power wiring. Run in separate raceways, or were exposed or in the same enclosure, provide 12-inch minimum separation between conductors to speaker-microphones, telephone wiring and adjacent parallel power. Provide physical separation as recommended by the equipment manufacturer for other system conductors.
- I. Identification of Conductors and Cables: Use color coding of conductors and apply wire and cable marking tape to designate wires and cables, so all media are identified in coordination with system wiring diagrams.
- J. Weatherproofing: Provide weatherproof enclosures for items to be mounted outdoors or exposed to the weather.
- K. Demo - Applicable for renovated school construction:
 - 1. Coordinate with GCPS IT Department, District Maintenance Shop, and Data contractor if needed so that the ceiling work with minimum exposer time to an open ceiling environment.
 - 2. Existing Rauland Intercom Rack will be removed and delivered to (DMS) District Maintenance Shop
 - 3. All the existing cabling, punch down blocks for all tap cans and equipment punch down boards, and junction punch down blocks located throughout the school building completely removed.
 - 4. SWC will remove all cable up to the entrance of the conduit. This includes the removal of flex up to conduit entry. If the cable can be removed easily without damaging any other cable or "free pull," it will be removed.
 - 5. Removal of existing speaker assemblies and call stations.
 - 6. SWC will provide fire caulking for any conduit as needed after the removal of cabling.
 - 7. SWC will demo the existing cable on the school rooftop that is connected to the portable classrooms.

8. SWC will coordinate with contractor and/or facilities maintenance department to provide replacement 2X4 ceiling tiles and T-Bar at every speaker location for demolition.

3.03 GROUNDING

- A. Provide equipment grounding connections for Integrated Electronic Communications Network systems as indicated. Tighten connections to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounds.
- B. Ground equipment, conductor, and cable shields to eliminate shock hazards and to minimize to the greatest extent possible, ground loops, standard mode returns, noise pickup, cross talk, and other impairments. Provide a 5-ohm ground at the central equipment location. Measure, record and report ground resistance.
- C. Provide all necessary transient protection on the AC power feed and all copper station lines leaving or entering the building. Note on system drawings the type and location of these protection devices as well as all wiring information.

3.04 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide services of a duly factory-authorized service representative for this project location to supervise the field assembly and connection of components and the pre-testing, testing and adjustment of the system.
- B. Inspection: Make observations to verify that units and controls are properly labeled, and interconnecting wires and terminals are identified.
- C. Testing: Rectify deficiencies indicated by tests and completely re-test work affected by such deficiencies at Contractor's expense. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

3.05 FINAL ACCECPTANCE TESTING

- A. The Final Acceptance Testing shall be provided to the Owner or the Owners designated representative only. Final acceptance testing to any other trade or service provider for the project will not comply with the requirements of this section.
- B. The contractor will provide a Final Acceptance Test record document signed by both the contractor and the Owner or designated Owner's Representative establishing the "In Warranty" date. The warranty period will not commence until the Final Acceptance Test is completed.
- C. Be prepared to verify the performance of any portion of the installation by demonstration, listening and viewing test, and instrumented measurements. Make additional adjustments within the scope of work and which are deemed necessary by the Owner because of the acceptance test.

3.06 COMMISSIONING

- A. The contractor shall train the Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventative maintenance of the system. This training will be following the training as outlined in the In-Service Training Section of these specifications. In addition to the Training Materials provided, the contractor will also furnish Operators Manuals and Users Guides at the time of this training.
- B. Schedule training with Owner through the owner's representative with at least seven days advance notice.

3.07 OCCUPANCY

- A. The contractor shall provide Occupancy Adjustments following these specifications. A response scenario amenable to both the owner and the contractor will be established and followed for the first year of service.

3.08 CLEANING & PROTECTION

- A. Prior to final acceptance, the contractor shall vacuum and clean all system components and protect them from damage and deterioration. All general areas within and around all equipment rack/cabinets in the facility will be swept, vacuumed, and cleaned up.

END OF SECTION