DESIGN REQUIREMENTS
FOR ALL GRADE LEVELS
UPDATED FEBRUARY 27, 2015
# Fulton County Schools Design Requirements

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*Updated February 27, 2015*
INTRODUCTION

These design requirements reflect Fulton County Schools’ (FCS) experience in building and operating schools. They are provided to assist design professionals in preparing contract documents for new schools, additions, and renovation projects, which balances the need for instructional functionality with aesthetics, accessibility, operability, and assurance of safety so that all students, staff, and community members feel welcome and safe.

Due to the increased complexity of the building systems that need to interface correctly to provide safe and efficient operations for the life of the building, all building mechanical and electrical system construction needs to be thoroughly checked for proper operation and fully commissioned.

The design requirements are organized into CSI divisions similar to the technical specifications, which will be prepared by and be the legal responsibility of the design professional of record. They illustrate FCS requirements. They are not intended to be complete technical specifications. The design professional shall be responsible for incorporating these requirements into the appropriate final contract documents.

All requirements noted shall be assumed to apply to every school type unless specifically noted. FCS or its designee shall be solely responsible for establishing and maintaining the FCS Design Requirements.

Design professionals shall coordinate use of these design requirements with related documents, including, but not limited to:

- FCS educational specifications
- GDOE’s architectural review documents
- GDOE’s grants administration documents
- Architect/engineer contract

FCS EDUCATIONAL SPECIFICATIONS

The FCS Educational Specifications provide descriptions of typical programmed spaces for each of the three main types of schools; elementary, middle, and high. These design requirements describe construction requirements applicable to all types of schools.

GDOE ARCHITECTURAL REVIEW DOCUMENTS

The GDOE requires that construction documents for FCS projects comply with GDOE standards and be submitted for formal review. These standards and review requirements are posted on the GDOE Facilities Services Resources web-site.

NOTE: Drawing submittals require coordination with the current GDOE “Curriculum and Space Needs” form for each project. These forms will be provided by GDOE through the FCS program manager.

GDOE GRANTS ADMINISTRATION DOCUMENTS

At projects where GDOE will provide funding, additional documentation is required. These documents are also posted on the GDOE Facilities Services Resources web-site.

ARCHITECTURAL/ENGINEERING CONTRACT

Contracts for new schools, additions and major renovations will be based on a professional services agreement for architectural and engineering services which provides a detailed description of the scope of work and obligations of the parties to the contract. Smaller projects may utilize other form of contract authorization to describe the scope of work and obligations.
GRADES TO BE HOUSED

Typical new schools will house the following grades:

- Elementary: Kindergarten, first, second, third, fourth, and fifth grades
- Middle: Sixth, seventh, and eighth grades
- High: Ninth, tenth, eleventh, and twelfth grades

BUILDING ENROLLMENT CAPACITY

Typical new schools will be designed for the following full time equivalent (FTE) capacity:

- Elementary: 850 TO 900 FTE (53 to 58 instructional units)
- Middle: 1,200 to 1,275 FTE (74 to 78 instructional units)
- High: 1,850 to 1,900 FTE (96 to 98 instructional units)

CORE CAPACITY

New schools shall be designed with the following core capacity:

- Elementary: 1,000 FTE (64 instructional units)
- Middle: 1,500 FTE (92 instructional units)
- High: 2,500 FTE (129 instructional units)

The “core” consists of ancillary spaces that support the classroom instructional spaces. These include the cafeteria, kitchen and media center. The GDOE has issued rules setting forth minimum floor areas for such spaces - based upon FTE. Thus, provision for expansion must begin with planning for a “core” large enough to support the largest practical FTE contemplated for a given site.

- In addition, classroom areas should be configured so as to allow for expansion with a minimum amount of alteration of the original structure or site.

ROOM NUMBERS

FCS requires incorporation of a single room numbering system for inclusion on all drawings, schedules, and on the signage installed in the building. This includes:

- Schematic drawings
- Design development drawings
- Working drawings
- GDOE inventory drawings
- Door and finish schedules
- HVAC equipment, automated temperature controls and energy system
- Signage on the building

To achieve this, the architect shall develop a compliant building and room numbering system at the schematic planning stage. The sequence of room numbers shall be assigned based on ease of locating rooms in the completed building. In order to direct students, staff and visitors, the sequence shall start at the main entrance and progress in a logical sequence throughout the building. Random numbering of rooms is not acceptable.

- Architect shall present building and room numbering system to FCS for review and approval before incorporating them into the construction documents. After room numbers are approved they shall not be casually altered without specific approval of FCS Facilities Services Department.
- Refer to Division 10 Signage section.
GDOE INVENTORY DRAWINGS

The architect shall prepare AutoCAD inventory drawings which the GDOE requires for the Local Facility Plan and FCS uses for convent reference. Inventory drawing standards:

- Deliver the inventory drawings to FCS, formatted and saved in AutoCAD 2009.
- Building walls shall be drawn in a simplified 2-D drawing format using AutoCAD # 8 Gray color and show only the net exposed surface of walls. (No hatching or interior chases)
- Show windows as a single Cyan Line without spandrels or sills.
- Show doors and swing as single lines similar to walls without thresholds or heads.
- Eliminate unnecessary detail features which may interfere with the readability of text at the prescribed sheet size.
- Identify all spaces, including corridors, stairs, elevators, and service rooms, with room name, room number, and net area.
- Standard sheet size = 11” x 17” without border
- Do not use more than one sheet per floor level. Adjust drawing scale as necessary to fit plan on the sheet and also retain readability. Typical scales: 1”= 40’, 1”= 50’ and 1”= 60’.
- All text must be readable without magnification when printed on 11” x 17” sheet. Use Century Gothic Font and colors to better distinguish room identification:
  - Bold red text for room number at rooms that have a corridor door
  - Plain red text at rooms within multi-room suites.
  - Show range of room numbers within multi-room suites (1200:1200.3)
  - Bold green text for GDOE instruction unit names
  - Plain black text for rooms names within suites
  - Plain black text for non-instruction rooms
  - Small bold cyan text for typical room area (784sf)
  - Larger bold cyan text for total multi-room suite area (4,000sf total)
- Net room areas shall be calculated based on the inside face of walls.
- Gross building areas shall be calculated to the exterior surface of exterior walls. Do not include overhangs.
- Provide separate area calculations for mechanical mezzanines and canopies.
- Text shall be individually positioned for each space for best readability.
- Additions shall be identified with a cyan dashed line border and a title box showing GDOE building number, gross area and year when first occupied on June 30.
- Refer to typical existing inventory drawings for required schedules, tables, and overall format.

PROPRIETARY SPECIFICATIONS

- Technical specifications shall generally be performance based and include a minimum of 3 acceptable manufacturers actively bidding in Georgia.
- These shall be reviewed by FCS or its designee in order to confirm acceptability.
- It is the desire of the Fulton County School System to utilize proprietary specifications for items for which there are less than three acceptable manufacturers or for items for which new purchases must be of the same manufacturer as existing to achieve system wide compatibility and economical use of funds in the maintenance of the systems.
- FCS will furnish a letter of justification for each project, which must be submitted with final documents to the GDOE.
- The design professional shall verify that the latest and most current document is used in contract documents.
- Most recent proprietary products and the justification for their use are listed in the Appendix to these design requirements.
GREEN CONSIDERATIONS & HIGH PERFORMANCE SCHOOLS

FCS recognizes the environmental impact of its buildings and the importance of green design and green building practices. The District uses Energy Star labeling and awards to showcase the efforts of proper design and operation.

Architects and engineers are encouraged to incorporate energy performance in the design process and design energy efficient buildings that will lower the schools overall operating and maintenance costs based on life-cycle analysis.

ACOUSTICAL STANDARDS

Architect/engineer shall be responsible for incorporating appropriate acoustic design measure into the Construction Documents.

Special Considerations:
- Acoustical design of stage areas to allow sound projection throughout the audience area
- Gymnasium, cafeteria, and music areas

Sound Quality Considerations:
- Control excessive reverberation
- Eliminate or minimize echoes
- Shape rooms to create uniform sound field in audience areas

Sound Isolation Considerations
- Separate noisy and quiet spaces
- Provide adequate speech privacy
- Isolate from exterior noise
- Isolate impact noise

Equipment Noise and Vibration Considerations
- Locate mechanical equipment with acoustical considerations
- Specify noise emissions of equipment
- Provide adequate vibration isolation. All equipment with moving parts will need isolation from the building structure to avoid vibration transfer.

Classroom Standards: Follow current ANSI S12.60 guidelines.
- Maximum allowable noise intrusion in classrooms due to typical occurring events such as diesel buses and truck passing: 45dB
- Reverberation Time (RT): 0.6 seconds maximum
- Between classrooms and corridor, stairs, office, or conference room: STC 45
- Between classroom and restrooms: STS 53
- Between classroom and music room, mechanical equipment room, cafeteria, and gymnasium: STC 60
- Between classrooms (floor to ceiling isolation): IIC 45 minimum

ASHRAE Guidelines
- Classroom noise criteria: NC 25-30
- Lecture room with speech amplification Noise Criteria: NC 25-30
- Lecture room without speech amplification Noise Criteria: NC 25 maximum

Miscellaneous Acoustical Considerations
- Reverberation time in cafeterias and gymnasiums: 1 second
- Background noise level in cafeteria and gymnasiums: 45 dB
- Building design shall address issues such as:
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- Plumbing noise intrusion into acoustically sensitive rooms
- Impact noise from lockers and basketball backboards into acoustically sensitive rooms
- Speech privacy at offices, conference rooms and speech therapy rooms

OWNER ORIENTATION AND INSTRUCTION

Technical specifications shall address requirements for training sessions for building equipment and systems

- Provide a training schedule spreadsheet for distribution to owner one week before training
- Provide video record of training for future reference
- Coordinate delivery of mechanical, electrical and plumbing manuals one week before training sessions
- Deliver kitchen equipment manuals same day as training
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DIVISION 1   GENERAL REQUIREMENTS

SECTION 01 7700 CLOSEOUT PROCEDURES

1. Provide operation and maintenance manual notebooks for all systems and equipment no later than 30 days prior to project substantial completion date.

2. Provide keys, valve schedules, attic stock materials, instruction confirmations, and as-built drawings no later than the project substantial completion date.
   2.1. Deliver keys direct to owner. Contact Maintenance Coordinator at (770) 969-3434.
   2.2. Deliver maintenance manual for gym floors direct to Coordinator of Environmental Services.

3. Provide all required warranties, inspection reports, governing certificates and other remaining required items within 30 days following the project substantial completion date.

4. Provide itemized list of kitchen equipment with brand, model, and serial number for each piece along with cost.
DIVISION 2 EXISTING CONDITIONS

Information included in this section shall be used by the design professional to prepare the civil-site design for the specified project. Deviation from these requirements must receive written approval from FCS. Notwithstanding this, FCS is open to and encourages suggestions for the use of alternative methods or materials that may prove more efficient and/or cost effective.

The design professional is expected to meet with Fulton County Schools Capital Improvement Program staff at the onset of each project to review project specifics and FCS expectations.

1. If land acquisition is involved, a complete ALTA/ACSM Land Title Survey of the property should be provided by FCS. The survey shall conform to the currently established standards for Land Title Surveys as adopted by The American Land Title Association and The American Congress on Surveying and Mapping in 2011 (or latest version). Survey must also cover owner identified services as indicated in Table A 'Optional Requirements'. Note: FCS must provide a current title inspection report (including all supporting documents in said report) prior to obtaining a final ALTA/ACSM certification. The Surveyor shall be required to provide an ASII file with all survey points.

2. If land acquisition is not involved, the design professional shall meet with FCS to establish the limits of topographic and boundary survey needed, and level of detail that is required. At a minimum, the topographic and boundary survey should contain the following information. Once the limits and level of detail required are established, FCS will provide the design professional with the appropriate information. If at any time during the design process, it is determined that additional information is needed, the design professional shall notify FCS in writing of the required information.

2.1. GENERAL INFORMATION
   2.1.1. Provide GPS* coordinates of all property pins
   2.1.2. Provide GPS* coordinates at the front (main) entrance to the building(s). GPS* coordinate shall be taken at the entrance threshold

   * The horizontal reference frame shall be North American Datum of 1983(HARN)-State Plane Coordinate System of Georgia. The vertical reference frame shall be North American Vertical Datum of 1988. Any directions or dimensions shown shall be a rectangular, ground level projection of the State Plane Coordinate System. Provide latitude and longitude for each GPS coordinate.

2.2. ADJACENT STREETS
   2.2.1. Names – identify as public or private
   2.2.2. Widths of pavement – provide dimension on survey
   2.2.3. Right of way dimensions – provide dimension on survey
   2.2.4. Center lines
   2.2.5. Edge of pavements
   2.2.6. Type of construction – identify as asphalt, concrete, gravel, etc.
   2.2.7. Curb and gutter (if existing)
   2.2.8. Elevation bottom of curb (if existing) - @ 20’ intervals
   2.2.9. Elevation top of curb (if existing) - @ 20’ intervals
   2.2.10. Elevation center line of street - @ 20’ intervals
   2.2.11. Elevation of both sides of sidewalks (if existing) - @ 20’ intervals

2.3. EXISTING SIDEWALKS (IF ANY)
   2.3.1. Width
   2.3.2. Distance from curb
   2.3.3. Type of construction - Identify as asphalt, concrete, etc.
   2.3.4. Identify longitudinal and cross slope of walks
   2.3.5. Identify extents of existing handrails (if applicable)
2.4. EXISTING GRADES
   2.4.1. Dashed, un-splined, polyline contours at a maximum two foot (2\') interval highlighted (bolder) ten (10) foot intervals
   2.4.2. Bench mark (on permanent object) (tied to USGS datum - Provide mean sea level elevation and provide reference of datum elevation NAD83, NAD27, etc.)
   2.4.3. Based upon field run readings (radial or grid) maximum distance between shots 50' (varies, based upon uniformity of existing grades)
   2.4.4. Topographic information should extend 100' beyond all property lines, 400' along frontage roads (beyond side property lines), 30' beyond R.O.W. of said frontage roads (across property frontage, and 30' beyond both R.O.W.s outside of property frontage) and 30' beyond all adjacent streets.

2.5. EXISTING TREES
   2.5.1. Mark all trees 18” or larger* (diameter at breast height). *Size requirements of trees to be surveyed shall be determined by local jurisdiction.
   2.5.2. Species of trees
   2.5.3. Specimen trees. Size requirements of specimen trees to be surveyed shall be determined by local jurisdiction. Mark as “Specimen.”

2.6. ELECTRIC SERVICE
   2.6.1. Type of service (size, underground, overhead)
   2.6.2. Depths of service lines (if underground). Service lines that require depth verification shall be determined by the design professional during the design phase. FCS will obtain information as needed.
   2.6.3. Location of poles and guys
   2.6.4. Service characteristics
   2.6.5. Location of ground transformers

2.7. COMMUNICATION SERVICES
   2.7.1. Identify type of service and location (cable, telephone, fiber optics, underground, overhead)
   2.7.2. Location of poles and guys
   2.7.3. Location of ground facilities (manholes, cross boxes, etc.)

2.8. WATER/GAS SERVICES
   2.8.1. Locations
   2.8.2. Size and type of lines
   2.8.3. Pressures. Service lines that require pressure verification shall be determined by the design professional during the design phase. FCS will obtain information as needed.
   2.8.4. Depths of service lines. Service lines that require depth verification shall be determined by the design professional during the design phase. FCS will obtain information as needed.
   2.8.5. Existing fire lines and hydrants on and within 100 feet of the site
   2.8.6. Fire flow data (static pressure, residual pressure, and GPM) taken at two locations
   2.8.7. Existing back flow preventers (BFP)
   2.8.8. Existing vaults
   2.8.9. Existing lift stations
   2.8.10. Existing meters
   2.8.11. Existing valves

2.9. SANITARY/STORM SEWERS
   2.9.1. Location
   2.9.2. Pipe size and type
   2.9.3. Direction of flow
   2.9.4. Septic drain fields including septic tanks and distribution boxes (based upon existing as-built drawings or other sources noted on survey)
2.10. MANHOLES/CATCH BASINS/DROP INLETS/CURB INLETS
   2.10.1. Location
   2.10.2. Top and invert elevations (pipes in and out) – curb inlets (DWCB, SWCB, CI (1019a) shall be shown with throat elevations (at face of curb at inlet location – both ends of structure top)
   2.10.3. Pipe sizes and direction of flow arrows

2.11. EXISTING CUT-INS FOR DRIVEWAYS
   2.11.1. Location
   2.11.2. Width
   2.11.3. Elevations at street and high point at sidewalk on center line of cut-In (if applicable)

2.12. Miscellaneous
   2.12.1. Existing buildings, temporary buildings with F.F.E. (identify changes in F.F.E. within same building)
   2.12.2. Existing downspouts or rainleaders (if any)
   2.12.3. Existing driveways (type of construction)
   2.12.4. Existing retaining walls (top and bottom elevations)
   2.12.5. Existing walks, playground equipment, site features (i.e. outdoor classroom, brick pavers, benches, trash receptacles, etc.)
   2.12.6. Existing fences (if any) and type
   2.12.7. Location of buildings on adjacent properties within 100’ of property being surveyed
   2.12.8. All adjacent property owners
   2.12.9. Zoning of site and all adjacent properties
   2.12.10. Tax map and parcel identification
   2.12.11. Required front, side and rear building setback lines
   2.12.12. Required buffer widths and type (if any)
   2.12.13. Provide bearing and distance to the nearest county GIS monument
   2.12.14. Off-site drainage areas
   2.12.15. Jurisdictional wetlands limit lines (if applicable)
   2.12.16. The 100 year IRF line (reference FIRM Panel) (if applicable)
   2.12.17. Verify sight distances along road(s) after driveway location(s) has (have) been determined
   2.12.18. Locate corners of proposed building on-site from preliminary site plan drawing for use by geotechnical engineer in locating soil boring holes
   2.12.19. Locate soil boring holes as drilled in field by geotechnical testing firm
   2.12.20. Provide survey in AutoCAD 2000 (.DWG) format, one reproducible copy or plot – NOTE: A scanned image (.TIF) of signed, sealed survey is acceptable for electronic delivery, however, six (6) hard copies of signed, sealed survey shall be provided to the owner/developer/client.
   2.12.21. North arrow, date of survey, and scale
   2.12.22. Survey shall bear seal of land surveyor registered in the state of Georgia. All deliverables shall be signed and sealed.
   2.12.23. Soil boring locations with label
   2.12.24. State waters within 200 linear feet of property shall be identified and labeled

• NOTE: SURVEYOR SHALL SECURE THE SERVICES OF A PRIVATE UTILITY LOCATOR FOR ITEMS 2.6, 2.7, 2.8 and 2.9.
• NOTE: SURVEYOR SHALL PROVIDE SURVEY INFORMATION WITHIN PUBLIC RIGHT-OF-WAY FOR A MINIMUM OF 150’ BEYOND PROPERTY CORNERS. SURVEY WITHIN THE RIGHT-OF-WAY SHALL EXTEND TO THE RIGHT-OF-WAY LINE ON THE OPPOSITE SIDE OF THE STREET. ADDITIONAL SURVEY WITHIN THE RIGHT-OF-WAY MAY BE NEEDED AS DESIGN PROGRESSES. DESIGN PROFESSIONAL SHALL DETERMINE LIMITS OF ADDITIONAL SURVEY DURING THE DESIGN PHASE. FCS WILL OBTAIN AS NECESSARY.
The following information will be provided by FCS on an as-needed basis.

1. Risk Hazard Analysis (RHA):
   1.1. Updated requirements of the GDOE’s Guideline for Risk Hazard Assessment of Educational Facility Sites 160-5-4-.16(a)5 (Effective Date May 30, 2012), and the GDOE’s Guideline for Educational Facility Site Selection 160-5-4-.16(a)6 (Effective Date May 30, 2012)

2. Phase I Environmental Site Assessment
   2.1. Per ASTM E1527-05

3. Asbestos and Lead Based Paint Surveys and Universal Waste Inventory (fluorescent lamps, mercury thermostats, etc.) if there are buildings on site.

4. Georgia Environmental Policy Act (GEPA) Evaluation
   4.1. GEPA guidelines as provided by the Board of Regents of the University System of Georgia revised June 25, 2007.

5. Cultural Resources Services - Literature and Records Search, Site Reconnaissance, Reporting

6. Wetland/State Waters Delineation and Endangered Species Review

7. Geotechnical Engineering Exploration and Evaluation
   7.1. Customized to planned construction including buildings and infrastructure.

It shall be the responsibility of the design professional to determine the need for any and/or all of the above reports/studies for each specific project. Should any and/or all of the reports/studies be required, the design professional shall notify FCS in writing of such need. Any reports/studies that are provided shall be reviewed by the design professional and incorporated as necessary into the design documents.
DIVISION 3 CONCRETE

SECTION 03 0100 SEALED CONCRETE
Sealed Concrete flooring is acceptable in large storage, mechanical and electrical rooms.

SECTION 03 3600 POLISHED AND DYED CONCRETE
Polished and/or dyed concrete may be considered for corridors in lieu of VCT.

1. Acceptable manufacturers:
   1.1. Basis of design: L.M. Scofield Company, Douglasville, GA 404.735.7184
   1.2. American Decorative Concrete
   1.3. Concrete Solutions, Inc.
   1.4. Abstract Concrete Dyes
   1.5. Synergy Surfaces

2. Materials
   2.1. Basis of design solvent based color liquid dye concentrate: by L.M. Scofield Company
       2.1.1. Provide manufacturer’s companion Lithium Densifier and Impregnator product to help ensure color and protection
       2.1.2. Scofield Formula One Liquid Dye Concentrate by L.M. Scofield Company
       2.1.3. Scofield Formula One Lithium Densifier MP by L.M. Scofield Company
       2.1.4. Scofield Formula One Guard-W by L.M. Scofield Company
   2.2. Planetary grinding equipment must be capable of providing a multiple step process starting with course metal bond diamonds and ending with fine resin bond diamonds

3. Cut and Shine Levels
   3.1. Cut Level (Depth of cut): Grade 1
   3.2. Shine Level (Gloss level): Class 2

SECTION 03 4133 PRECAST STRUCTURAL PRETENSIONED CONCRETE
Stadium Seating: Structure for home side stadium seating shall be precast pre-stressed concrete

1. Structure shall be designed to drain storm water away from the structure
2. Precast panel joints shall be caulked to prevent leakage
3. Provide seating for 2,500 based on 24” width per occupant
4. See Division 13 – SPECIAL CONSTRUCTION for stadium aluminum bench seats.
**SECTION 04 0513  MASONRY MORTARING AND GROUTING**

Only one mortar color will be allowed at each new school.

**SECTION 04 0523  MASONRY ACCESSORIES**

1. Specify manufactured mortar nets over the horizontal run of through wall flashing to catch mortar dropping and allow water to filtrate easily downward through the net material to the flashings and out the weeps.

2. Weeps and vents – Provide weeps immediately upon the horizontal leg of the through wall flashing at the exterior wall construction element at sills, beams and lintels at 24” o.c. maximum.

**SECTION 04 2113  BRICK MASONRY**

Brick veneer shall be used as the exterior building material of choice. Changes in brick types, sizes, color, texture and orientation shall be kept to a minimum. Color(s) shall be recommended by the design professional and approved by FCS.

**SECTION 04 2200  CONCRETE UNIT MASONRY**

Concrete block shall be use for the interior wall material for new middle and high schools. Bull-nosed block shall be used for all outside corners. Split-faced block shall not be used unless specifically requested by FCS.

1. Concrete masonry unit partitions (CMU) are preferred wherever possible at middle and high schools. See Division 9 FINISHES for other materials.

2. CMU partitions are required at:
   2.1. Vaults and the adjacent office used for book keeping (extend to roof or cap with concrete slab.)
   2.2. Middle and high school corridors and other high traffic areas
   2.3. Gymnasium, auditorium, stage, cafeteria, and kitchen
   2.4. Main mechanical and electrical rooms
   2.5. Group restrooms and other high abuse areas
   2.6. Locker rooms
   2.7. Mechanical and electrical closets
DIVISION 5 METALS

SECTION 05 1200 STRUCTURAL METAL FRAMING

Structural steel framing systems shall generally be used for new school construction as opposed to load-bearing masonry construction.

SECTION 05 5133 LADDERS

Submit provisions for roof access to Executive Director of Facilities Services for review and approval.

1. All low-pitch roofs shall have a permanent means of access unless specifically exempt by FCS.
2. Stairs are preferred.
3. Interior ladders provided for roof or mezzanine access shall be a ship’s type ladder.
4. Vertical or exterior ladders from the ground are not acceptable for required access to the roof.
5. Vertical fixed ladders may be used to access small areas projecting above the main roof.
6. Ladders and stairs shall be equipped with appropriate guard and handrails.

SECTION 05 5200 RAILINGS

1. Gates at guard rails between interior track and bleachers in high school gyms shall be self-storing.
2. All interior and exterior handrails shall be of welded aluminum construction with satin finish.
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DIVISION 6 WOOD, PLASTICS AND COMPOSITES

SECTION 06 2000 FINISH CARPENTRY

1. Plastic Laminates:
   1.1. General use counter tops shall be plastic laminate material.
   1.2. Due to repeated problems with delaminating of plastic laminate surfaces from substrate where the plastic laminate is joined at edges of countertops, backsplashes, etc., one-piece countertop/backsplash with bullnose edges and coved backsplash shall be specified. Color(s) to be selected from a limited palette by the design professional and approved by FCS.

2. Casework: Use standard casework found in catalogues. Custom casework shall only be used where manufactured casework will not serve the intended use. Plastic laminate shall be used as appropriate. Refer to the FCS Education Specifications for additional casework requirements.
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DIVISION 7 THERMAL AND MOISTURE PROTECTION

SECTION 07 1100 DAMPPROOFING
1. Appropriate dampproofing shall be specified by the design professional.
2. Avoid parapet wall penetrations.

SECTION 07 1300 WATERPROOFING
1. Appropriate waterproofing and vapor retarders shall be specified by the design professional.
2. Avoid parapet wall penetrations.

SECTION 07 2100 THERMAL INSULATION
1. Appropriate insulation shall be specified by the design professional to provide a safe, energy efficient, comfortable building, and to meet building codes.
2. Enclose space under first level of all stairs to prevent misuse of space for storage or misconduct.

SECTION 07 2400 EXTERIOR INSULATION FINISH SYSTEMS (EIFS)
1. These are acceptable for use where not accessible to abuse.
2. All E.I.F.S. should have water management capability.

SECTION 07 4113 ARCHITECTURAL METAL ROOF PANELS
1. Metal roof panels should comply with the following requirements:
   1.1. Metal roofing shall be used on high-slope roofs. Steel is preferred; aluminum is acceptable.
   1.2. Minimum roof slope for metal panel systems on new construction is 4 inches per foot unless otherwise approved by FCS.
   1.4. All endwall trim and roof transition flashing shall allow the roof panel to move relative to the wall panel and/or the parapet as the roof expands and contracts with temperature change.
   1.5. Additional structural framing (where required)
      1.5.1. Furnish complete erection drawings prepared by or under the supervision of a professional engineer legally authorized to practice in the jurisdiction where the project is located.
      1.5.2. Include details showing fabrication and assembly of the metal roofing system.
      1.5.3. Show all fastenings and roof framing.
      1.5.4. Include detail drawings as required. Fabricate and install in accordance with standards of SMACNA Architectural Sheet Metal Manual and NRCA Metal Roof Panel Systems.
   1.6. Roofing panels: provide details of edge conditions, joints, corners, custom profiles, supports, anchorages, trim flashings, closures, and special details.
   1.7. Sheet metal accessories
      1.7.1. Provide layouts at ¼-inch scale. Provide details of gutters, downspouts, and other sheet metal accessories at not less than ½ inch scale showing profiles, method of attachment, and anchorages.
   1.8. Provide samples for initial selection purposes in the form of manufacturer’s color charts or chips showing full range of colors, textures, and patterns available for metal roofing with factory-applied finishes.
   1.9. Provide installer certificates signed by the metal roofing manufacturer certifying that the installer is approved to install the specified system and that such installation will be approved for the roofing system manufacturer’s watertight warranty with flashing endorsement.
1.10. Standing seam roof panel
   1.10.1. Factory roll-formed roof panel sheet from structural quality 24 gauge galvanized steel or 0.032” thick aluminum. Field formed not acceptable.
   1.10.2. Standing seams shall be a nominal 1 3/4 inches high.
   1.10.3. Panel coverage shall be a 16 inches. The use of 24 inch wide panels is not approved.
   1.10.4. Valleys shall have appropriately spaced striations.
   1.10.5. Roofing panels shall be “snap-together” seam types with concealed clip system.
   1.10.6. Panels shall be continuous from eave to ridge.
   1.10.7. Architectural panels are to be installed over an approved deck and insulation system, concealed fasteners and bearing plates shall be used.

1.11. All self-adhering, heat resistant membrane laps shall be taped in accordance with the vapor retarder manufacturer’s installation requirements.

1.12. All closures, ridge, hip, and valley flashings, and any other items associated with the metal panel system shall be fabricated and approved by the roofing system manufacturer. The use of field-fabricated items is not approved.

1.13. All penetrations and curbs shall be flashed in accordance with the roofing system manufacturer’s written instructions and approved shop drawings, and flashings shall be included in the roofing system warranty provided to FCS.

1.14. Sealant shall be approved by the roofing system manufacturer. Sealant shall be applied between all lapped metal sections. The application of sealant after metal sections have been lapped is not acceptable and will be subject to rejection.

SECTION 07 5216 MODIFIED BITUMEN ROOFING

1. Roofing
   1.1. System shall conform to the requirements of Factory Mutual 1-90 wind uplift requirements.
   1.2. Membrane system shall be a three ply, Type VI asphalt-coated fiber glass felt, adhered in solid moppings of Type III or IV asphalt, and one ply of granule-surface, polyester reinforced SBS modified bitumen cap sheet.
   1.3. The use of torch-grade SBS or APP modified bitumen cap sheet is approved, so long as the installer has received documented training from the roofing system manufacturer or its authorized trainer for the safe application of such materials, and that the installer shall implement all required fire safety protocols during such installation.
   1.4. All membrane plies shall be installed in accordance with the roofing system manufacturer’s written instructions. All plies shall be fully adhered to the substrate and to each other without voids.
   1.5. Cap sheet shall be installed within the timetable established by the roofing system manufacturer after fiber glass felts have been installed. Failure to meet this requirement will result in the application of an asphalt primer to the exposed fiber glass felts prior to the installation of the cap sheet. This requirement cannot be waived by the roofing system manufacturer.
   1.6. All voids in the fiber glass felts, to include dry laps, shall be cut out and repaired prior to the installation of the cap sheet.
   1.7. Membrane plies shall be installed within the asphalt manufacturer’s EVT requirements.
   1.8. Mineral perlite or wood fiber cants shall be installed at horizontal-to-vertical transitions and shall be adhered to both surfaces in solid moppings of hot asphalt or adhesives approved by the designer.
   1.9. The use of a single ply TPO membrane system is acceptable. Membrane should be 80 Mil and contain no PVC.

2. Base Flashing
   2.1. Shall be installed in accordance with the roofing system manufacturer’s written requirements and the design document.
   2.2. At a minimum, the base flashings shall consists of one ply of Type VI asphalt-coated fiber glass felt and one ply of granule-surfaced, polyester-reinforced SBS modified bitumen cap sheet, adhered in solid moppings of hot, Type III or IV asphalt. The use of torch-grade SBS or APP modified bitumen cap sheet is approved, but shall conform to the requirements set forth for membrane installation.
2.3. Base flashings shall have a minimum finished height of 8 inches above the surface of the roof, no exceptions. Designer shall ensure that new curbs are fabricated to meet this requirement.

2.4. Base flashings shall be installed without voids.

3. Insulation

3.1. Attachment of the roof insulation to the deck or approved substrate shall conform to Factory Mutual 1-90 wind uplift requirements.

3.2. Isocyanurate roof insulation shall have a minimum compressive strength of 20 PSI.

3.3. A minimum of two layers of roof insulation shall be installed. Mechanical fastening through two layers is not approved. The application of the roof membrane directly over isocyanurate roof insulation is not approved.

3.4. The cover board shall be approved by the roofing system manufacturer and shall be incorporated into the manufacturer’s system warranty.

3.5. Insulation and/or cover boards shall be adhered to the approved substrate in solid mopings of hot Type III asphalt or low-rise adhesives approved by the roofing system manufacturer.

3.6. All insulation and/or cover boards used in the roof assembly shall be covered by the roofing system manufacturer in the No Dollar Limit warranty. Any insulation and/or cover board materials not manufactured by the roofing system manufacturer shall be included in such warranties.

3.7. At internal roof drains, tapered insulation sumps shall be installed to insure positive drainage. Tapered insulation crickets shall be installed between internal roof drains to insure positive drainage.

3.8. At eaves, the designer shall insure adequate slope is achieved to preclude ponded water conditions. The use of a row of tapered insulation may be required/specifed to ensure this requirement is met.

4. Roof Drainage

4.1. The designer shall review proposed drainage system requirements with FCS during design conception.

4.2. The designer shall make reasonable efforts to drain water to eaves with gutters placed on the exterior wall in lieu of internal roof drains.

4.3. Internal gutters are not approved under any circumstances.

4.4. Downspouts shall be connected to underground drainage systems for new construction. At existing facilities without underground drainage systems, surface discharge is acceptable.

4.5. Use PVC or cast iron downspout boots in areas subject to abuse.

4.6. Boots of some type shall be used to protect downspout from damage.

4.7. Downspout transition fittings need to be seamless or welded fittings.

4.8. Internal drain system requirements:

4.8.1. Drain bowls shall be set in a flat drain receiver flush with the top of the deck. Drain heights to match the top surface of roof insulation shall be accomplished with the use of drain extensions.

4.8.2. Under-deck clamps and associated structural framing for internal roof drains and overflow drains are required.

4.8.3. All primary drains and leaders shall be wrapped with an approved insulation system.

4.8.4. Drains shall be connected to the leader with a 4-band, no-hub connector system, any other connection must be approved by FCS.

4.8.5. The use of drain leaders extending through the roof and flashed with lead is not approved.

4.8.6. Metal strainers shall be specified. The use of plastic strainers is not approved.

4.9. Through-wall scuppers

4.9.1. Through-wall scuppers must receive FCS approval for new construction.

4.9.2. Height of existing through-wall scuppers shall be adjusted so that the bottom edge is flush with the top of the new roof system. If overflow through-wall scuppers are present, the heights shall be adjusted so that the bottom of the scupper is no more than 4 inches above the height of the primary drainage system.

SECTION 07 6200 SHEET METAL FLASHING AND TRIM

Sheet metal flashing and trim shall comply with the following requirements:

2. Perimeter sheet metal systems may be shop-formed or factory-fabricated, but must meet Factory Mutual 1-90 wind uplift requirements.

3. Gutters should be 20GA (0.050” aluminum) and downspouts should be minimum 24 GA (0.032”) thick aluminum with Kynar 500 finish factory-applied coating are acceptable metals/coatings. Copings and fascias: thicknesses should vary from 22GA (0.040” aluminum to 18 GA (0.080” aluminum) and should be designed and installed for wind loads per code. Additionally, if shop-fabricated brake metal copings or fascias are proposed, they must have been tested and passed ANSI/SPRI ES-1.

4. Continuous cleats are required at all gravel stop-fascia locations.

5. Where coping is installed, continuous cleats are required on the exterior legs. The interior leg may be secured with appropriate screw fasteners with EPDM washers at spacings not to exceed 12 inches on center, or can be secured with continuous cleats.

6. Pitch pans, if approved for use by FCS, shall be fabricated from either 24 gauge galvanized steel or 24 gauge stainless steel. All lapped joints shall be soldered or welded; the use of caulk to seal joints is not approved.

7. Nominal 4 lb., 30” x 30” lead sheets shall be installed at all internal roof drains. Both sides shall be primed prior to installation.

8. Nominal 4 lb. soil pipe vent lead flashings with 12” x 12” flanges shall be used. Both sides of flange shall be primed prior to installation.

9. All surface mounted counterflashings shall be secured with a termination bar with appropriate fasteners at spacings not to exceed 12 inches on center.

10. The back of all gutters shall be a minimum of 1” higher than the front, no exceptions.

11. Applications under gravel top/fascia units should be the roof system base Sheet. Comply with roof manufacturer’s details. For other applications, such as installation under copings, a self-adhering, heat-resistant membrane should be used, similar to Grace Construction Products, Grace Ice & Water Shield HT (high-temperature) or architect approved equal.

**SECTION 07 6500 FLEXIBLE FLASHING**

Flexible flashing shall comply with the following requirements:

1. Use copper, stainless or rubberized asphaltic flashing with an adhesive backing for through wall flashings at sills, beams and lintels.

2. If a fluid-applied air barrier is specified, the flexible flashing should be part of that system. Metal flashing products may be laminated with other materials such as asphalt or waterproof papers to reduce galvanic corrosion where necessary. Follow manufacturer’s recommendations when specifying through wall flashing and installation accessories.

**SECTION 07 7233 ROOF HATCHES**

Appropriately located roof hatches shall be provided as required for access to low slope roof areas with ability to be secured from inside.

**SECTION 07 8100 FIREPROOFING**

Enclose space under first level of all stairs to prevent misuse of space for storage or misconduct.
SECTION 08 1113 HOLLOW METAL DOORS AND FRAMES

1. General: doors shall be 36” wide.
   1.1. Pairs of 36” doors with a removable mullion shall be provided at service entrances, throughout major circulation corridors and for access into large rooms such as the cafeteria, stage, gym, and media center in order to facilitate delivery of bulky objects.
   1.2. Single 42” doors shall be provided at kitchens from the delivery corridor, and for access to bulk storage room, serving area, and cafeteria.
   1.3. Single 42” doors shall be provided for access into music practice and storage rooms to facilitate movement of large instruments.

2. Door Height: Door height at new schools shall be 80” minimum. Height of doors and frames shall be selected for best value and efficiency. Door height at renovations shall match existing.

3. Stile and Rail Doors: All hollow metal stile and rail doors shall be constructed with 6” stiles, 8” top rails and 10” bottom rails. Doors with exit devices shall have center rails.

4. Metal Doors: Metal doors shall be used on the exterior and interior of the building where appropriate for greater security. Provide heavy duty door and hardware at Vaults and Record Rooms.

5. Door Lites and Sidelites: Provide factory installed small vertical door lights (not hollow metal sidelights) at typical doors to classrooms and other frequently used doors.
   5.1. Larger door lights and hollow metal sidelights may be used at the following:
      5.1.1. Administration
      5.1.2. Counseling
      5.1.3. Media Center
      5.1.4. Gymnasium
      5.1.5. Cafeteria
   5.2. Provide an observation light at the kitchen delivery door constructed of security glass designed to resist break-ins.
   5.3. Interior window frames shall be hollow metal and shall be provided at offices where supervision of adjacent areas is required. Do not provide interior windows at Locker Rooms.
   5.4. Provide interior windows in the kitchen manager’s office to allow observation of workers in the kitchen and vendors during deliveries.

6. Hollow Metal Frames: Hollow metal frames shall be used throughout except at primary entrances where aluminum storefront systems shall be used

SECTION 08 1400 WOOD DOORS

1. General: doors shall be 36” wide.
   1.1. Pairs of 36” doors with a removable mullion shall be provided at major circulation corridors and for access into large rooms such as the cafeteria, stage, gym, and media center in order to facilitate delivery of bulky objects.
   1.2. Single 42” doors shall be provided at kitchens from the delivery corridor, and for access to bulk storage room, serving area, and cafeteria.
   1.3. Single 42” doors shall be provided for access into music practice and storage rooms to facilitate movement of large instruments.

2. Door Height: Door height at new schools shall be 80” minimum. Height of doors and frames shall be selected for best value and efficiency. Door height at renovations shall match existing.

3. Stile and Rail Doors: Wood stile and rail doors shall be constructed with 6” stiles, 8” top rails and 10” bottom rails. Doors with exit devices shall have center rails.

5. Metal Doors: Metal doors shall be used on the exterior and interior of the building where appropriate for greater security. Provide heavy duty door and hardware at vaults and record rooms.

6. Door Lites and Sidelites: Provide factory installed small vertical door lights (not hollow metal sidelights) at typical doors to classrooms and other frequently used doors.
   6.1. Larger door lights and hollow metal sidelights may be used at the following:
       6.1.1. Administration
       6.1.2. Counseling
       6.1.3. Media center
       6.1.4. Gymnasium
       6.1.5. Cafeteria

6.2. Provide an observation lite at the kitchen delivery door constructed of security glass designed to resist break-ins.

6.3. Interior window frames shall be hollow metal and shall be provided at offices where supervision of adjacent areas is required. Do not provide interior windows at locker rooms.

6.4. Provide interior windows in the kitchen manager’s office to allow observation of workers in the kitchen and vendors during deliveries.

7. Hollow Metal Frames: Hollow metal frames shall be used throughout except at primary entrances where aluminum storefront systems shall be used.

SECTION 08 3326 COILING GRILLES

1. Special wide roll-up doors shall be provided as appropriate for access to shops, stage scenery areas, mechanical rooms, and storage rooms to facilitate movement of bulky objects. Note: lock must be accessible from both sides.

2. Where required by Educational Specifications: Provide manual operated solid roll-up shutters with security latch operated by turn knob on room side.

3. High School – between Serving Lines and Cafeteria:
   3.1. Provide electrically operated roll-up grilles in lieu of solid roll-up doors to allow for air circulation.
   3.2. Locate key operated control on serving line side.
   3.3. Do not provide supplemental latches or dead-bolts. Grilles shall be secured by the weight of the grille.

4. High School – at Corridors between Separation Zones:
   4.1. Provide electrically operated roll-up grilles to limit access at corridor separation zones. These shall be in addition to emergency smoke doors that may be required by code.
   4.2. Locate key operated control on both sides.
   4.3. Provide security latch operated by key, accessible from both sides.

SECTION 08 4113 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

1. Aluminum storefront systems shall be used at primary entrances to the building. Aluminum doors shall be “wide stile”

2. Door Height: Door height at new schools shall be 80” minimum. Height of doors and frames shall be selected for best value and efficiency. Door height at renovations shall match existing.

3. Stile and Rail Doors: All aluminum stile and rail doors shall be constructed with 6” stiles, 8” top rails and 10” bottom rails. Doors with exit devices shall have center rails.
SECTION 08 5113 ALUMINUM WINDOWS

1. All exterior window frames shall be aluminum. In general, exterior windows shall be operable, and shall be large enough to permit their use as an emergency escape routes. Steel window frames are not acceptable at exterior walls.

2. Architects are encouraged to incorporate windows for natural lighting into as many building spaces as practical. However, excessively large windows and windows with decorative applied mullions are not acceptable. Architect shall provide a cost-benefit analysis of cost savings provided by proposed window lighting compared to their impact on HVAC installation and operating cost.

3. Minimum Requirements:
   3.1. Elementary: Windows are required at all general instruction classrooms.
   3.2. Middle: Windows are desired at all general instruction classrooms.
   3.3. High: Windows are desired at all general instruction classrooms.

SECTION 08 7100 DOOR HARDWARE

1. Appropriate finish hardware shall be specified by the design professional for review and approval by FCS.
   1.1. See APPENDIX to DESIGN REQUIREMENTS – Door Hardware

2. Cylinders: Hardware must be heavy duty type and accept the proprietary Best removable core system.
   2.1. Proprietary Product: Best Lock Company

3. Door Closers:
   3.1. Proprietary Product: LCN

4. Fire and Smoke Doors: All fire and smoke doors shall have magnetic hold-open devices interfaced with the fire alarm system.

5. Overhead Fire and Smoke Doors: Doors shall be equipped with easily tested and re-set mechanisms.

6. Panic Hardware:
   6.1. Proprietary Product: Von Duprin

SECTION 08 8000 GLAZING

General exterior glazing shall be double insulated. Provide tempered, laminated, fire-resistant rated and impact-resistant glass as required by codes. Use tinted glass for sun control in lieu of blinds at large and inaccessible windows at Clerestories, Lobbies, Corridors, Media Centers, Cafeterias, Gymnasiums and similar spaces.
SECTION 09 2900 GYPSUM BOARD

Designer should obtain current finish schedule from FCS.

1. Gypsum board wall systems are acceptable for interior partitions at light duty spaces such as offices and partitions between classrooms and labs. In addition, gypsum board is to be used for interior partition walls in new elementary schools. In general, two layers of gypsum board should be applied to each side. The outer layer shall be abusive resistant type. Use fire code type material as required by code. Bullnose corner beads shall be used at typical outside corners. Corner guards, in lieu of bullnose corners, may be used at the Administrative and Guidance areas. Sound batts shall be used to reduce the sound transmission coefficients of the wall system as needed.

2. The following special considerations need to be followed when gypsum board wall systems are used.
   2.1. At K-1 classroom restrooms use Fiberglass Reinforced Panels (FRP) covering, bonded to flooring material in a moisture resistant manner.
   2.2. Water resistant wall finishes need to be installed in the area of the janitorial sinks to prevent water damage over time.
   2.3. Keep gypsum ½” off of floor, run FRP to floor.
   2.4. Rated gypsum board systems may also be used at firewalls starting 10'-0” above finish floor where the wall will not be susceptible to vandalism or abuse.

3. Non-accessible Ceilings: Ceilings at restrooms, locker rooms and other similar spaces, including Kitchen Manager’s Office and Locked Closet, shall have non-accessible ceilings to prevent students from getting into ceiling plenums unobserved.

4. Ceiling access panels need to be installed wherever hard ceilings are installed to access valves, smoke detectors, etc. Minimum size shall be 24” x 24”, if personnel access is required (i.e. more than hand access to reach a valve).

SECTION 09 3000 TILING

1. Quarry Tile: Epoxy flooring is the FCS standard for flooring in new construction at kitchen, walk-in cooler and freezer, dry storage, serving courts, and custodial wet areas. Quarry tile may be used on a limited basis for patching and repairing existing quarry tile floors.

2. Ceramic Tile: Epoxy flooring is the FCS standard for flooring in new construction at restrooms. Ceramic tile may be used on a limited basis for patching and repairing existing ceramic tile floors.

SECTION 09 5100 ACOUSTICAL CEILINGS

2 x 2 ceiling grids with 2’ x 2’ suspended ceiling boards shall be used for all general use areas of the building. Special treatment may be needed in selected areas, such as kitchens and auditoriums. In general, floor-to-ceiling heights should be 8’-8”.

1. Standard ceiling tile shall be square edge, non-directional, fissured design, 5/8” thickness. Advise FCS if thicker tile is required for acoustic performance. See Acoustical Standards in the Introduction of these Design Requirements.

2. Cafeteria – hard, washable tile needs to be installed around high HVAC vents in cafeterias, similar material to that used in the kitchen.

SECTION 09 6466 WOOD ATHLETIC FLOORING

High school and middle school gym flooring shall be solid maple wood strip athletic flooring system.

1. Minimum thickness shall be 7/8”, No.2 or better grade maple.

2. The flooring system shall be specifically made for athletic flooring applications.
3. Flooring shall include multi-purpose court markings and custom designed school logo approved by FCS.
4. Provide recessed supports for three volleyball nets at all middle and high school gyms.
5. Provide event floor covering at wood floors which are also used for auditorium and other assembly functions.

SECTION 09 6500 RESILIENT FLOORING

1. Sheet Vinyl Flooring: At K-1 classroom restrooms, FCS preference for bonding the floor system to FRP wall coverings is to use sheet vinyl flooring with integral turned up cove base sealed to the FRP wall covering. Architects shall provide specific details designed to ensure that urine cannot seep through the floor and wall finishes to the structure.

2. Resilient Tile Flooring:
   2.1. Typical floor finish, except where specialized finishes are called for, shall be Vinyl Composition Tile. Size of VCT shall be 12” x 12” x 1/8”. Color and patterns shall be specified by the design professional and approved by FCS. Colors shall be standard manufacturer’s colors.
   2.2. At elementary and middle school corridors, the floor pattern shall incorporate a contrasting strip of tile set 24” clear of each wall in order to define an emergency safety zone for students. Corridor patterns shall be submitted to FCS Director of Safety and Security for review and approval.
   2.3. Coordinate the sequence for cleaning and waxing VCT floors with FCS Coordinator of Environmental Services and Coordinator of Warehouse. Schedule cleaning and waxing of VCT floors at corridors, cafeteria and other designated areas after furniture is delivered.

3. Base shall be 4” black or dark brown rubber cove base. Provide black rubber transition strips adjacent to other floor materials.

SECTION 09 6566 SYNTHETIC ATHLETIC FLOORING

1. Elementary Schools: Synthetic athletic flooring will be installed in all elementary school gyms.
   1.1. Acceptable manufacturers:
       1.1.1. Basis of design: Connor SportGrain Plus.
       1.1.2. Taraflex Multi-Use.
       1.1.3. Shaw Rexcourt
       1.1.4. Johnsonite/Tarkett/Amerisport
   1.2. Color: Faux maple wood
   1.3. Court markings: Basketball court markings

2. Indoor Track Athletic Flooring: Polyurethane Flooring over Rubberized Base with continuous stripping for three lanes.

3. Weight Room Athletic Flooring: Recycled rubber material formed into squares with interlocking tabs, free-laid without adhesive.
   3.1. Basis of design: Robbins Sports Surfaces - Freeweight

SECTION 09 6600 TERRAZZO FLOORING

Terrazzo may be considered for entrance logos at high schools after analysis of its cost and specifically approved by FCS. Terrazzo shall not be located at entrance porches subject to wind-blown rain. Consider alternative materials which do not present a slipping hazard for entrance logos.

SECTION 09 6623 EPOXY RESINOUS FLOORING

Epoxy Resinous Flooring is acceptable for use at athletic and PE Locker Rooms, student restrooms, and kitchens. A high temperature polyurethane flooring system should be used under kitchen hood where floor may come into contact with hot materials.
1. Acceptable manufacturers:
   1.1. Basis of design: Stonhard, Inc., Stonshield HRI Epoxy Flooring System and Stonshield UTS Polyurethane Flooring System
   1.2. Dexotex, Division of Crossfield Products Corporation
   1.3. Selby, Division of Degussa Building Systems
   1.4. Key Resin

2. Stonshield HRI System (Epoxy) Characteristics:
   2.1. Overall system thickness: Nominal ¼”
   2.2. Integral Cove Base: 4”
   2.3. Wearing Surface: Medium

3. Stonshield UTS System (Polyurethane) Characteristics:
   3.1. Overall system thickness: Nominal ¼”
   3.2. Integral Cove Base: 4”
   3.3. Wearing Surface: Medium

**SECTION 09 6800 VINYL CUSHION TUFTED TEXTILE (CARPET)**

Vinyl Cushion Tufted Textile is acceptable for use where the Education Specifications call for carpet or carpet tile, e.g., administration offices, media center, etc.)

1. Acceptable manufacturers:
   1.1. Basis of design: Powerbond Cushion RS

**SECTION 09 9000 PAINTING AND COATING**

1. Exterior painting: Exterior painting shall be in accordance with the manufacturer’s recommendations for the paint used and the material being painted. Color shall be selected by design professional (from five standard choices) and approved by FCS. In general materials with factory applied paint, coatings, or integral color should be specified in order to reduce maintenance costs.
   1.1. Basis of design: Sherwin-Williams

2. Interior painting: Interior painting shall be in accordance with the manufacturer’s recommendations for the paint used and the material being painted. Semi-gloss shall be used unless otherwise approved. Color shall be selected by design professional (from five standard choices) and approved by FCS. In general, materials with factory applied paint, coatings, or integral color should be specified in order to reduce maintenance costs.
   2.1. Basis of design: Sherwin-Williams

3. Epoxy paints shall not be specified except for use in kitchens: waterborne epoxy paint only.
DIVISION 10 SPECIALTIES

SECTION 10 1100 VISUAL DISPLAY UNITS

Visual Display boards and related accessories shall be included in the construction contract.

1. See Educational Specifications for location, quantity and size.

2. Marker boards shall be factory laminated 3-ply construction with porcelain-enamel low-gloss face sheet, 3/8” particleboard core and aluminum sheet backing.
   2.1. Provide aluminum frame with chalk tray and map rail.
   2.2. Provide appropriate special graphic at math and music rooms.
   2.3. Provide manual sliding marker boards at science labs.

3. Tackboards shall be 1/4” thick, plastic-impregnated cork sheet factory laminated to ¼” thick particleboard backing. Provide factory applied aluminum trim.
   3.1. Basis of design: Claridge Products & Equipment, Inc.
   3.2. Color to be natural cork color provided this is one of the manufacturer’s standard colors. If natural cork color not available, select from manufacturer’s standard colors and obtain approval from FCS.

SECTION 10 1400 SIGNAGE

1. Room Signage: Appropriate signage shall be provided for in accordance with code and ADA requirements.
   1.1. Typical classrooms, labs and multi-purpose rooms shall be identified by room number only.
   1.2. Permanent special purpose rooms and suites (administration, counseling, media center, gymnasiums, cafeteria, staff dining, kitchen, restrooms, electrical, mechanical, custodial, IDF, etc.) should be identified by name and number, but not individual rooms within suites that may be subject to re-assignment.
   1.3. Provide easy to read directional signage at lobbies, corridors, stairways, elevators and other special components to aide students, staff and visitors in navigating the building.
   1.4. Cafeteria serving lines shall be identified with easy to read graphics as well as functional room numbers for identification. Submit graphics to Executive director of School Nutrition for review and approval.

2. Room Numbers
   2.1. Room numbers shall be all numeric as required for GDOE Inventory.
   2.2. Major room numbers at multi-story buildings shall be four digits starting with the floor level, and progress around the building in sequence (# 1211 = 1st floor, 2nd wing or Corridor, 11th room). Small spaces within major rooms or suites shall be identified with the major room number plus numeric suffix (# 1211.1). Where possible use whole thousands for wings or corridors (1200) and use postal odd-even progressive numbers down corridors (odd on right (1211), even on left (1212). All spaces must be numbered including corridors, stairs, elevators, and service rooms. Stairs, elevator and service rooms may be numbered as a suffix of the corridor leading to them.
   2.3. One story buildings shall be similar, but may use three digits when identification of the story is not needed
   2.4. Room numbers at additions shall extend existing Inventory Drawing numbers without repeats

3. Site Signage (Road, Parking, and Drive Entrance): Appropriate metal signage shall be included in the contract per code and local requirements.
   3.1. Parking and traffic signage shall be included in the site design and Construction Documents.
   3.2. Identify restrictions on use of parking spaces such as handicap, staff, visitors, students, etc.
   3.3. Provide way-finding signage for major facilities such as visitor parking, building entrance, parent and bus drop-offs, stadium, ball fields, etc.
   3.4. Provide signage clearance from curbs to prevent bus “tail swing” from damaging signposts. Similar clearance needs to be maintained for bus canopy posts.
   3.5. Mount signage on building walls and columns where possible.
3.6. Coordinate sign design with FCS Executive Director of Transportation.
3.7. Provide space at entrances for standard building identification sign furnished and installed by FCS.

4. Marquee Sign (Elementary Schools):
4.1. In addition to the directional and building identification signage described above, include a double sided non-illuminated school marquee sign in the construction documents for elementary and middle schools.
4.2. The sign shall include a top panel with the school name and a second panel for manual placement of letters for messages.
4.3. Basis of design Double Sided with 4’ Double Pole Package manufactured by “adsLES, Inc” or approved equal.
4.4. Provide an alternate for a masonry base compatible with the building design.
4.5. Architect shall determine the most functional location for the marquee sign and obtain prior-approval by FCS Facilities Services

5. Marquee Sign (Middle Schools):
5.1. In addition to the directional and building identification signage described above, include a double sided non-illuminated school marquee sign in the construction documents for elementary and middle schools.
5.2. The sign shall include a top panel with the school name and a second panel for manual placement of letters for messages.
5.3. Basis of design Double Sided with 4’ Double Pole Package manufactured by “adsLES, Inc” or approved equal.
5.4. Provide an alternate for a masonry base compatible with the building design.
5.5. Architect shall determine the most functional location for the marquee sign and obtain prior-approval by FCS Facilities Services

6. Marquee Sign (High Schools):
6.1. In addition to the directional and building identification signage described above, include a double sided LED school marquee sign in the construction documents for high schools.
6.2. Basis of design: LED Sign System # s216-6 Double Sided with 4’ Double Pole Package manufactured by adsLES, Inc. or approved equal.
6.3. Provide an alternate for a masonry base compatible with the building design.
6.4. Architect shall determine the most functional location for the marquee sign and obtain prior-approval by FCS Facilities Services.

SECTION 10 2115 PHENOLIC TOILET AND URINAL PARTITIONS

Toilet partitions and urinal screens shall be provided at multi-person restrooms.
1. Partitions and screens shall be solid phenolic material with color impregnated through the entire thickness of the material.
   1.1. FCS color preference is black. Use of alternate color must be approved by FCS Facilities.
2. Partitions shall be floor mounted and overhead braced.
3. Hardware shall be heavy duty extruded aluminum or stainless steel.
4. Wall brackets for partitions and screens shall be extruded aluminum, continuous “double T” type.
5. Masonry partitions shall not be used.

SECTION 10 2813 TOILET ACCESSORIES

Provide surface mounted heavy duty stainless steel commercial quality restroom and bath accessories as needed.
1. Locate soap dispensers over lavatories.
2. Provide electric hand dryers. Architect shall specify type of hand dryers subject to review and approved by FCS Facility Services before issuing Project Manual.

3. Coordinate paper dispenser requirements with FCS Coordinator of Environmental Services.

4. Provide one long mirror per Restroom and one lavatory mirror per lavatory.

SECTION 10 5113 METAL LOCKERS

1. Metal Student Lockers at Corridors (middle schools and high schools): Provide metal double tier lockers at middle and high schools corridors for student use.
   1.1. Provide lockers equal to 110% of the “Design” FTE plus corridor space to increase the number of lockers to the “core” capacity.
   1.2. Each locker shall be approximately 12” wide x 12” deep x 36” high x double tier (72” total unit height).
   1.3. Lockers shall be equipped with multi-point automatically locking spring bolt and built-in key-controlled, three-number dialing combination lock with changes made automatic with a control key. Provide ADA compliant keys locks on 1% of all lockers ordered.
   1.4. Utilize welded construction with 16 gauge bodies, 14 gauge doors with stiffeners and 18 gauge backs.
   1.5. Door shall have piano hinges, fastened with screws, not welded.
   1.6. Doors and frame (body) of lockers shall be painted one color.
   1.7. Locker colors may alternate or be different in different parts of the building.
   1.8. Specify manufacturer’s standard paint colors unless use of custom colors is requested and specifically approved by FCS.
   1.9. Utilize a painted metal “Z” base in lieu of raised concrete (or other material), eliminating the need for resilient base finish.
   1.10. Extend VCT floor finish below lockers to allow for their future removal if desired.
   1.11. Enclose sides of lockers with wall piers and tops with wall furring.
   1.12. Provide six additional doors of each color specified for future replacement.

2. Physical Education (PE) Lockers (middle schools and high schools): Provide metal lockers at middle and high schools PE Locker Rooms.
   2.1. Provide the following number of lockers:
      2.1.1. Middle School: 675 lockers in five-tier units plus 60 lockers in double tier units at each Boys and each Girls PE Locker Room.
      2.1.2. High School: 800 lockers in five-tier units plus 90 lockers in double tier units at each Boys and each Girls PE Locker Room.
   2.2. Lockers in five tier units shall each be approximately 12” wide x 12” deep x 12” high (60” total unit height).
   2.3. Lockers in double tier units shall each be 12” wide x 12” deep x 30” high (60” total unit height).
   2.4. Sides and intermediate partitions shall be expanded metal for ventilation.
   2.5. Lockers shall be equipped with Multi-point automatically locking spring bolt and pad-lock lug.
   2.6. Provide three-number dialing combination pad-locks with a master key for 110% of lockers in five-tier units.
   2.7. Utilize welded construction with 16 gauge bodies, 14 gauge doors with stiffeners and 18 gauge backs.
   2.8. Doors shall have piano hinges, fastened with screws, not welded.
   2.9. Doors and frame (body) of lockers shall be painted one color selected from manufacturers standard paint colors.
   2.10. Provide continuous built-in poured concrete combination bench and base for lockers, 18” AFF and extending 12 to 14” from face of lockers.

3. Home Team Lockers (High Schools): Provide metal lockers at high school Home Team Locker Rooms.
   3.1. Provide approximately 34 single tier lockers at each of the 4 Boys and 4 Girls Team Locker Rooms.
   3.2. Lockers shall be 18” wide x 18” deep x 72” high single-tier.
   3.3. Sides and intermediate partitions shall be expanded metal for ventilation.
   3.4. Lockers shall be equipped with Multi-point automatically locking spring bolt and padlock lug.
Division 10 Specialties

3.5. Provide three-number dialing combination pad-locks with a master key for 110% of lockers
3.6. Utilize welded construction with 16 gauge bodies, 14 gauge doors with stiffeners and 18 gauge backs
3.7. Doors shall have piano hinges, fastened with screws, not welded
3.8. Doors and frame (body) of lockers shall be painted one color selected from manufacturers standard paint colors
3.9. Provide six additional doors for future replacement
3.10. Provide appropriate number of laminated maple locker room benches

4. Visitor Team Lockers (High Schools): Provide approximately 20 athletic style metal lockers at Visitor Team Room
   4.1. Lockers shall be 30” wide x 18” deep x 72” high open front with combination seat and foot locker and 12” Security box
   4.2. Security box shall be equipped with built-in key-controlled, three-number dialing combination lock with changes made automatic with a control key
   4.3. Foot locker shall be equipped with padlock lug
   4.4. Provide appropriate number of laminated maple locker room benches

5. Metal PE Staff Lockers: Provide metal lockers for PE Staff. Locker construction shall be similar to student corridor lockers with built-in combination locks. Provide the following number and size lockers:
   5.1. Elementary School PE Staff: three single-tier lockers 12” wide x 15” deep x 72” high at each male and female PE staff area.
   5.2. Middle School PE Staff: three single-tier lockers 12” wide x 15” deep x 72” high at each male and female PE staff area.
   5.3. High School PE Staff: ten single-tier lockers 15” wide x 21” deep x 72” high at each male and female PE staff area.

6. Metal Custodial Staff Lockers: Provide metal lockers for Custodial Staff. Each locker shall be approximately 12” wide x 15” deep x 72” high single-tier. Locker construction shall be similar to student corridor lockers with built-in combination locks. Provide the following number of lockers:
   6.1. Elementary School: 6
   6.2. Middle School: 8
   6.3. High School: 16

7. Metal Kitchen Staff Lockers: Provide metal lockers for kitchen Staff. Each locker shall be approximately 12” wide x 12” deep x 36” high x double-tier (72” total unit height) similar to student corridor lockers. Provide the following number of lockers:
   7.1. Elementary School: 10
   7.2. Middle School: 12
   7.3. High School: 16

SECTION 10 5613 METAL STORAGE SHELVING

Specify adjustable industrial heavy duty metal shelving in all Storage and Custodial Rooms. Typical shelving units shall be 36” wide x 85” high x depth appropriate for the intended use (12”, 18” or 24”). Shelves for book storage shall be 12” deep. Provide 7 shelves per unit (including base and top) to allow approximately 12” clear vertically per shelf.

SECTION 10 7316 CANOPIES

1. Prefabricated (Manufactured) Canopies
   1.1. Appropriate aluminum canopies shall be provided for at bus and auto drop-off areas, and loading areas as needed. Custom features like cantilevered trusses or excessive coverage distance should be avoided
   1.2. Drainage shall be controlled and piped to prevent flow across sidewalks.
   1.3. Provide adequate curb/bus set-back for posts to ensure bus “tail swing” clearances.
   1.4. Provide lighting at Canopies. See Division 26 ELECTRICAL for site lighting requirements.
1.5. Provide adequate height requirements for bus and truck clearances; height requirements shall be reviewed and approved by FCS Executive Director of Transportation.

2. Main Entrance Canopies
   2.1. Provide building main entrance canopies designed with materials and design appropriate to the building.
   2.2. Drainage shall be controlled and piped to prevent flow across sidewalks.
   2.3. Provide lighting at Canopies appropriate to the Canopy design.

SECTION 10 7500 FLAGPOLES
Provide 30’ high aluminum tapered ground set flagpole (with an external halyard) in a prominent location at the front of the building.

SECTION 10 9000 TELEVISION BRACKETS
Television Brackets: Furnish and install TV wall brackets including appropriate wall bracing at all rooms requiring televisions. Coordinate size and selection of brackets with FCS. Television sets will be furnished by FCS.
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DIVISION 11  EQUIPMENT

SECTION 11 2723 DARKROOM DOORS AND EQUIPMENT

Darkrooms are provided only at high schools.
1. Revolving door/pedestrian access needs to be provided. However, a standard pedestrian door with light-tight gasketing also needs to be provided to allow service and ADA access to the area.
2. Ventilation equipment needs to be designed to meet vapor emissions of the darkroom chemicals.

SECTION 11 4000 FOOD SERVICE EQUIPMENT

NOTE: Contact FCS for current list of required kitchen equipment. See Appendix for additional kitchen information and diagrams illustrating typical kitchen equipment layouts for elementary, middle, and high schools.

Kitchen Equipment shall be incorporated into the scope of work for all new school projects.
1. Architects shall be responsible for employing a qualified professional kitchen designer to develop appropriate kitchen design and construction documents
2. Drawings and specifications shall be submitted to FCS Nutrition and Facilities Services for review and approval
3. The GDOE will no longer approve proprietary kitchen equipment. FCS will provide the A/E with a list of three acceptable manufacturers of kitchen equipment for new schools and renovations

SECTION 11 5119 BOOK THEFT PROTECTION EQUIPMENT

1. At exit(s) from Media Center, provide a complete book theft detection system with alarm, detection targets/strips, and target detuners/deactivators. The system, by means of exit antennas and radio signals, shall detect library materials marked with pressure sensitive detection target/strip. When items pass between the antenna system and have not been checked out correctly, the system shall emit an alarm signal notifying library personnel of an unauthorized removal of items. An exit aisle shall be formed by a minimum of 2 sensing antennas, with exiting between the antennas. Aisles shall be not greater than 6 feet wide.

SECTION 11 5123 MEDIA CENTER SHELVING AND CASEWORK

1. Layout shall be presented to the Coordinator of Media Services with a detailed analysis of sight lines for security contro
2. Obtain written approval before coordinating related electrical and data outlets
3. Preference is for steel shelving system with oak trim to match other wood components
4. Wood shelving and other species of wood to match wood components used elsewhere will be considered subject to cost effectiveness and specific approval of FCS Facilities Services Department
5. Preferred shelving system shall be cantilevered-bracket type metal library shelving system for storing books and other library media
6. Provide single-face and double-faced shelving with adjustable shelves cantilevered on brackets from a central column, part of an integral frame unit. All components shall be modular and interchangeable to permit reconfiguration with no additional items. Shelving shall be complete with all appurtenant features, and with appropriate heights and other dimensions.
7. End panels shall be constructed of 1" thick solid wood with no particle board. All exposed wood parts shall be made of select wood. Panels shall be full width and height of ranges to completely cover exposed ends of bookshelf units. They shall be bolted to the last upright in the ranges.
8. Construct sloping wood magazine shelving, circulation desk and miscellaneous furniture of 3/4” thick, 7-ply veneer core, with plain-sliced face veneers with matching solid edging.

9. Provide canopy tops at all units 42” high or shorter. Tops shall be 1-1/4” thick, 3-ply particleboard construction with .050” high-pressure laminate on both faces with ¾” thick solid wood edging, from manufacturer’s standard selection on all edges.

10. Tops shall be assembled in continuous lengths to completely cover the tops of bookshelf units, including corners. Where joints are required, they shall be splined and bolted to produce a flush connection. Tops shall be braced with brackets designed to permit tops to support books and displays.

11. Acceptable Manufacturers:
   11.1. The basis of design: Montel Aetnastak, Inc.
   11.2. Borroughs Corp.
   11.3. Bretford Inc.
   11.4. Estey/Tennisco
   11.5. Library Bureau Steel
   11.6. MJ Industries
   11.7. Russwood Library Furniture

SECTION 11 5213 PROJECTION SCREENS

1. Provide a 12’ x 16’ motorized screen at elementary, middle and high school stages.
   1.1. Provide additional drop header to set bottom of screen 2’-0” above stage floor
   1.2. Screen shall be mounted immediately in front of the stage curtain
   1.3. Basis of design shall be Da-Lite Screen Co. Inc. Cosmopolitan Electric

2. Provide an 8’ x 8’ motorized screen at elementary, middle and high school media centers
   2.1. Screens shall be recessed in the ceiling suspended from structure above or mounted on CMU wall
   2.2. Basis of design shall be Da-Lite Screen Co. Inc. Cosmopolitan Electric
   2.3. Provide a 5’ x 5’ Pull-down screen at typical Instructional Units

SECTION 11 6100 THEATRICAL/STAGE EQUIPMENT

Architects shall be responsible for employing a qualified professional stage equipment designer to develop appropriate design and construction documents for auditorium, drama labs and other performance studios.

1. Provide lighting, sound systems, curtains and other equipment appropriate for the specific program.

2. Provide a catwalk at high school auditoriums for access to front overhead stage lighting. Drop lighting access is unacceptable.

3. See Division 26 ELECTRICAL - Theatrical Lighting Systems.

4. Drawings and specifications shall be submitted to FCS Drama Coordinator and Facilities Services for review and approval.

SECTION 11 6500 ATHLETIC EQUIPMENT

1. Architect shall be responsible for developing appropriate design and construction documents for middle and high school athletic equipment subject to review and approval by FCS Coordinator of Health and PE and by the Supervisor of Interscholastic Athletic Programs

2. Bleachers: See Division 12 FURNISHINGS for telescoping bleachers and Division 13 SPECIAL CONSTRUCTION for exterior bleachers

3. Football Goal Post at High School Stadiums and Practice Fields:
   3.1. Basis of design, Gill model # F305, 8’ off-set, 23’-4” between 20’ uprights

4. Track and Field Equipment at High School Stadiums:
4.1. Long Jump/Triple Jump: Basis of design, Gill Model # 441TS Complete System-Synthetics
4.2. Pole Vault Box: Basis of design, Gill Model #500 Box, # 503 Lid
4.3. Shot Put Circle Toe Board: Basis of design, Gill Model #360
4.4. Discus Circle: Basis of design, Gill Model #367

5. Soccer Goal at High Schools:
5.1. Basis of design, Gill Model # 477100, Portable Aluminum Soccer Goal

6. Exterior Basketball Goals, Backboards and supports at middle schools:
6.1. Goals: Heavy-duty, fixed type with nylon net
6.2. Backboard: Heavy-duty rectangular steel
6.3. Minimum 4-1/2” diameter steel pipe with 5’-0” gooseneck extension

7. Gymnasium Basketball Backstops and Components at middle and High Schools:
7.1. Provide six electrically operated retractable basketball goals at each gymnasium as required by the Educational Specifications.
7.2. Frame assembly:
   7.2.1. Type: Overhead supported, single center post with sway bracing, forward folding type for main court and cross courts
   7.2.2. Superstructure: Manufacturer’s standard design for attachment to building structure with precision die-formed fittings
   7.2.3. Hoist operations: Manufacturer’s one HP minimum electric winch; self-locking worm-gear type, capable of holding backstop at any position when raising or lowering; control by wall mounted key switch
   7.2.4. Safety Lock: Manufacturer’s safety lock, inertia sensitive lock type, capable of locking backstop in any position at any time in storage or during raising or lowering cycle due to sudden surge in speed; provide for all backstops
   7.2.5. Finish on exposed metal components: Manufacturer’s powder coat finish; color selected by architect from Manufacturer’s standard colors and approved by FCS Facilities Services Department
7.3. Backboards: (Main and Cross Court): Rectangular design, ½” thickness tempered glass panel in gasketed extruded aluminum frame with bolt-on padding along bottom edge and up sides 10’ minimum; fired vitreous enamel markings conforming with official requirements, 42” high x 72” wide
7.4. Basketball Goals: steel rod rim welded to mounting bracket with enamel finish and nylon netting; provide breakaway type goals for main court backstops; all goals shall be designed to absorb shock loads due the slam dunking or hanging on the rim

8. Gymnasium Wall and column padding:
8.1. Bonded foam filled over OSB backing board with fire retardant liner and vinyl coated nylon cover
8.2. Panel thickness: Minimum 2”
8.3. Wall panel size: 2’-0” wide x 6’-0” high
8.4. Column pad size: Custom fabricated to fit around columns; height to match wall panels
8.5. Color: As selected by the architect from manufacturer’s standard colors and approved by FCS Facilities Services Department

9. Wrestling Equipment:
9.1. Wrestling Mat
9.2. Wrestling Mat Storage system

10. Volleyball and Badminton Equipment:
10.1. Nets and removable support post
10.2. Gym Floor sleeves for Volleyball and Badminton post:
   10.2.1. Sleeve diameter: 3-1/2” inside diameter
   10.2.2. Cover plate: Chrome plated cover assembly with swivel type hinge and removable key
   10.2.3. Installation: Cast into concrete footing and floor slab for flush mounting with wood floor system

Updated February 27, 2015
11. Other athletic equipment as indicated on the drawings

SECTION 11 6643  INTERIOR SCOREBOARDS

Provide complete interior score boards systems at the following locations:

1. High School Main Gym: Provide two scoreboards
   1.1. Basis of design, Electro-mech Scoreboard Company Model #2770
2. High School Auxiliary Gym: Provide two scoreboards
   2.1. Basis of design, Electro-mech Scoreboard Company Model #2330
3. Middle School Gym: Provide two scoreboards
   3.1. Basis of design, Electro-mech Scoreboard Company Model #2330

SECTION 11 6813  PLAYGROUND EQUIPMENT

1. FCS requires two playgrounds at each elementary school.
   1.1. One playground is designed for grades K-2 and a second playground for grades 3-5
   1.2. Each playground should be designed to fit within a 55’ x 55’ area
   1.3. Playgrounds to be located within close proximity to each other and concrete play area
   1.4. Preferred location is close to school but away from classrooms
   1.5. ADA access must be provided to each playground along with an accessible ramp into the playground
   1.6. Play surface to be 12” of compacted Engineered Wood Fiber (EWF)
   1.7. Each playground to be installed above grade and have a plastic border around the entire playground
   1.8. Playgrounds to have underground drainage system
   1.9. The basis of design is Miracle, A division of PlayPower. FCS has a renewable purchase agreement with Miracle. Designer to include pre-approved playground designs
   1.10. Play equipment installer shall be approved by the equipment manufacturer

2. Kindergarten – 2nd grade area:
   2.1. This playground requires 14 active components including ground level and elevated equipment
   2.2. All elevated and ground level elements to be ADA accessible
   2.3. Playground will accommodate approximately 45 users

3. 3rd-5th grade area:
   3.1. This playground requires 17 active ground level components
   3.2. Playground will accommodate approximately 50 users
   3.3. All elements to be ADA accessible

SECTION 11 6843  EXTERIOR SCOREBOARDS

Provide complete Exterior Score Boards systems at the following locations:

1. High School Stadium: Provide one scoreboard
   1.1. Basis of design, Electro-Mech Scoreboard Company Model #3585
2. High School Baseball and Softball: Provide one scoreboard at baseball and one at softball
   2.1. Basis of design, Electro-Mech Scoreboard Company Model #1580

SECTION 11 6900  CONCESSION FACILITIES AND EQUIPMENT

1. Concession facilities shall be provided at the following locations as identified in the Educational Specifications:
   1.1. Middle School Gym
   1.2. High School Main Gym
   1.3. High School Auditorium
   1.4. High School Stadium (Home and Visitor sides)
   1.5. High School Baseball/Softball area
2. Concessions facilities shall include the following utilities and equipment
   2.1. Lockable serving room with adjacent lockable bulk storage room
   2.2. Standard overhead florescent lighting
   2.3. Ventilation fan with thermostatic control
   2.4. Heat at exterior locations to protect pipes from freezing
   2.5. Counter with serving window
   2.6. Lockable base and wall storage cabinets
   2.7. Double sink with hot and cold running water
   2.8. Ice machine with 75 pound capacity furnished and installed under the building contract. Drain pipe shall not be located in pathway
   2.9. Floor drain, locate near ice machine
   2.10. A 200 amp electrical service to support 110V/220V outlets for appliances furnished by others; appliances shall be limited to refrigerator, microwave oven, drink cooler, hot dog machine, hot dog warmer, popcorn machine and other light duty appliances. Heavy duty appliances such as cooking ranges and fryers which require hoods and fire protection equipment are specifically prohibited.

SECTION 11 9600  CUSTODIAL MAINTENANCE EQUIPMENT

1. A separate space for floor equipment recharging station/garage shall be provided to keep self-propelled and other custodial equipment from obstructing mechanical rooms. The designated area shall be equipped with electrical service needed to meet the demands of the recharging equipment. Any appropriate fire separation and ventilation shall be provided.

2. Custodial washer/dryer location is needed in each building to wash custodial mop heads, dust mops and cleaning cloths.

3. Provide a ramp and walkway from building to the top of dumpsters so that custodial personnel can fully load dumpsters without personal injury
DIVISION 12 FURNISHINGS

SECTION 12 2113 BLINDS

Interior blinds shall be 1” aluminum horizontal slats.

Basis of design shall be Levolor Riviera.

1. Provide blinds at typical classroom and Lab exterior windows
2. Use tinted glass for sun control in lieu of blinds at large and inaccessible windows at clearstories, lobbies, corridors, media centers, cafeterias, gymnasiums and similar spaces
3. Interior windows are provided by the Educational Specifications for supervision purposes and shall not have blinds except where specifically approved by FCS Chief Operations Officer or designee

SECTION 12 3200 MANUFACTURED WOOD CASEWORK

1. Manufactured casework includes but is not limited to:
   1.1. Typical classroom teacher wardrobe/storage cabinet (36” wide x 24” deep x 80” high)
   1.2. Classroom and office vertical storage cabinets, base cabinets with counter tops and wall cabinets
   1.3. Miscellaneous specialty cabinets and shelving
2. Construction: Cabinet bodies shall be standard high pressure plastic laminate finish over industrial grade particleboard.
   2.1. Cabinet backs shall be minimum ¾” commercial standard CS-251 tempered hardboard or minimum 3/8” high performance 47 lb. density particleboard.
   2.2. Cabinet sub-base shall be of a separate and continuous ladder-type platform design, leveled and floor mounted prior to cabinet body placement. Material shall be exterior grade plywood. No cabinet sides to floor will be allowed. Base front shall be finished with 4” high black extruded rubber cove base with pre-molded corners to match room base.
   2.3. Counter tops shall be 1’ deeper than base cabinet and 1-1/2” thick with high pressure plastic laminate finish.
   2.4. Counter tops for computers shall be 30” deep and be equipped w/ grommets and wire management below.
   2.5. Counter tops without sinks shall have particleboard core and water resistive adhesive.
   2.6. Counter top with sinks shall be constructed with calibrated plywood and non-soluble glue to thickness indicated.
   2.7. Counter backsplash shall match countertop construction.
   2.8. Drawer fronts and hinged doors shall be overlay style with higher pressure laminate exterior and interior liner and matching 3mm PVC edging.
   2.9. Shelving behind doors shall be high pressure plastic laminate on particle board core with matching 3mm PVC edging. Shelves behind doors up to 27” wide shall be ¼” thick and 1” thick if over 27” wide up to 36” wide. Open shelving shall be 1” thick. No shelving shall exceed 36” unsupported width.
   2.10. Shelving shall be adjustable and supported by side panels with concealed fasteners capable of supporting the specified content.
3. Hardware:
   3.1. Hinges shall be satin finish stainless steel, adjustable 5-knuckle, institutional grade, 2-3/4” overlay type with hospital tip with minimum load capacity of 310 lbs/pair. Anchor hinges with engineered screws (no wood screws)
   3.2. Pulls for drawers and swing doors shall be ADA compliant one piece semi-recessed molded contour finger pulls
   3.3. Catches shall be nylon roller or friction type
   3.4. Drawer slides shall be heavy duty, side mounted type, equipped with heavy duty ball bearing nylon wheels and automatic positive stops
Division 12 Furnishings  Fulton County Schools  
Design Requirements

3.5. Locks shall be half mortise design with only round cylinder exposed, five tumbler cylinder, keyed separately with master key: satin finish
3.6. Shelf clips shall be heavy duty design to hold shelf in place
3.7. Submit a sample which includes every typical component including hardware and shelf retaining clips

4. Accessories: Provide accessories appropriate to the cabinet’s function.
4.1. Warranty: Provide manufacturer’s standard 5-year warranty against defects in material and workmanship.
4.2. Acceptable manufacturers:
   4.2.1. Basis of design: LSI Corporation of America, Inc., New Century Line L44
   4.2.2. Basis of design: TMI Systems Design Corporation as modified to meet specified requirements
   4.2.3. Stevens industries
   4.2.4. Case Systems, Inc.
   4.2.5. Cabinets by Design
   4.2.6. Southside Manufacturing Corporation

SECTION 12 3550 MUSIC CASEWORK

1. Casework shall be designed for appropriate storage of music instruments, stands, sheet music and teaching aids.
2. Casework shall be constructed of industrial grade particleboard with plastic laminate finish selected from manufacturer’s standard finishes.
3. Musical instrument storage cabinets and racks shall be specifically designed and engineered for the storage and protection of the instruments stored, shall meet specified minimum performance standards, shall be chip and abrasion resistant under normal usage, and shall protect instruments from damage under normal school use.
4. Each individual compartment shall have a welded steel grill door with non-binding 180 degree five knuckle safety tip hinges and a one-piece finger pull/padlock hasp with integral door stop feature and no moving parts.
5. Hardware finish shall be white epoxy powder coat.
6. Provide manufacturer’s standard 5-year warranty against defects in material and workmanship.
7. Acceptable Manufacturers:
   7.1. The basis of design:
       7.1.1. LSI Corporation of America, Inc. 8200 Series
       7.1.2. Musical Instrument Storage System by TMI Systems Design Corporation as modified to meet specified requirements
   7.2. Stevens Industries
   7.3. Wenger Corporation
   7.4. Case Systems, Inc.

SECTION 12 3553 SCIENCE LABORATORY CASEWORK AND EQUIPMENT

Science casework and equipment includes, but is not limited to the following:
1. Modular laboratory casework, including casework, tops, ledges, filler panels, knee space panels supporting structures and miscellaneous items of equipment as specified or scheduled.
   1.1. Demonstration tables
   1.2. Student tables
   1.3. Peg boards
   1.4. Fume hoods, equipped with worktop, base cabinet and specified accessories
   1.5. Utility service outlet accessory fittings, electrical receptacles and switches shall be listed in the specifications, equipment schedules or shown on drawings as mounted on the laboratory furniture
1.6. Laboratory sinks, cup sinks or drains troughs, overflows and sink outlets with integral tailpieces, which occur above the floor, and where these items are part of the equipment or list in the specifications, equipment schedules or shown on the drawings

2. Science Casework and related furniture shall be of oak construction. Base cabinets and case units shall be lipped style construction having drawer heads and hinged doors with radius edges, overlapping cabinet and case openings on all edges
   2.1. Cabinets shall be constructed with flush interiors having no offsets to maximize drawer and cupboard space and ease of cleanability
   2.2. Face frame construction cabinets or cases are not acceptable
   2.3. Cabinets shall be assembled using blind mortised and tenoned (or rabbeted) joints, glued and screwed together in accordance with best cabinet maker methods
   2.4. Cabinets or casework featuring pinned or doweled construction is not acceptable
   2.5. All exposed joints shall be closely fitted and tight showing no open joints
   2.6. All exposed corners shall be rounded
   2.7. Counter and table tops shall be 1” thick chemical resistant solid monolithic molded modified epoxy resins with surface coating; black color
   2.8. Hardware shall be stainless steel with satin finish
   2.9. Provide manufacturer’s standard 5-year warranty against defects in material and workmanship

3. Acceptable Manufacturers:
   3.1. The basis of design:
       3.1.1. Kewaunee Scientific Corporation, Signature Series
       3.1.2. Leonard Peterson Company, Vanguard Series.
   3.2. Campbell Rhea Intuitional Casework, Inc.
   3.3. Collegedale Casework, LLC.
   3.4. Fisher Hamilton, LLC

SECTION 12 4619 CLOCKS
Clocks: FCS will provide battery-operated clocks where required at instructional and other areas.

SECTION 12 6500 AUDITORIUM SEATING
1. Auditorium Seating shall be fixed upholstered multiple seating with self-raising seat mechanisms, steel or plastic seat pans, plastic rear panels and wood arm rest. Provide accessories, including end panels, aisle lights, folding tablet arms and seat numbers. All seating components shall be provided by a single manufacturer. Seating Layout shall be designed with standards spaced laterally in rows so that end standards are in alignment from first to last row, regardless of whether aisles converge or are of constant width, and so that sightlines are optimized. Provide appropriate accommodations for wheelchairs in accordance with ADA.

2. Acceptable Manufacturers:
   2.1. Basis of design: American Seating, floor-mount Stellar Model 2001 or Stellar Model 220
   2.2. Royal Seating, JG Seating
   2.3. Hussey Seating Company
   2.4. Irwin Seating Company
   2.5. Seating Concepts
   2.6. Track Seating division of Track Corp

SECTION 12 6613 TELESCOPING BLEACHERS
Provide telescoping bleachers at middle and high school gymnasiums.
1. The bleacher system shall consist of motor operated, multi-tiered, closed deck seating rows operating on the telescoping principal, and stacking vertically in minimal floor area when not in use
2. The structural system shall be engineered to withstand all applicable design loads associated with the intended use.

3. Provide non-marring rubber tire wheels designed for wood or synthetic floors and sized appropriately for the specific bleacher.

4. Provide self-storing railings at all exposed bank ends and elevated sections.

5. Coordinate bleacher layout with ADA requirements for wheelchair seating.


7. Decking and steps: Plywood.

8. Finish wood surfaces with one coat of moisture repellent sealer and two coats of polyurethane finish.

9. Provide vinyl curtains where necessary to restrict access below bleachers.

10. Motor Operation:
    10.1. Provide integral automatic electro-mechanical propulsion system engineered specifically for the requirements of the bleacher system.
    10.2. All wiring within the seating bank, as well as all service wiring to the units, shall be provided, including remote control panel or pendent control.
    10.3. Controls: Start, stop, forward and reverse in a single control unit together with appropriate safety limiting features.
    10.4. Motors shall be three phase and accessible from the front of the bleachers.

11. Warranty: Provide manufacturer’s standard 5-year warranty against defects in material and workmanship.

12. Acceptable Manufacturers:
    12.2. Interkal, LLC Telescoping Seating System.
    12.3. Irwin Telescoping Seating Company.
DIVISION 13 SPECIAL CONSTRUCTION

SECTION 13 3416 GRANDSTANDS AND BLEACHERS

1. Stadium Bleachers at Visitor side: Provide aluminum grandstand bleacher system at Visitor side of high school stadiums complete with bench seats, and all related appurtenances, fittings and accessories; system shall include, but is not limited to:
   1.1. Provide seating for 1,200 based on 24” width per occupant
   1.2. Compliance with all safety and building codes, including accessibility codes
   1.3. Understructure supporting framing
   1.4. Decking system
   1.5. Stairs and ramps
   1.6. Slip resistance surfaces
   1.7. Guard and handrails
   1.8. Water drainage provisions

2. Stadium Aluminum Bench Seats at home side: Provide aluminum bench seats for home side concrete stadium grandstands
   2.1. Provide seating for 2,500 based on 24” width per occupant
   2.2. See Division 3 – CONCRETE for Stadium Seating structure

3. Portable Bleachers: Provide aluminum portable bleachers at high school baseball fields, softball fields and tennis courts complete with bench seats, and all related appurtenances, fittings and accessories; attach bleachers to a concrete slab extending to walkway system
   3.1. 5 rows high x 10’ deep x 21’ long
   3.2. 42” central aisle with steps
   3.3. Appropriate guardrails
   3.4. Wheelchair cut out at each end
SECTION 14 2000  ELEVATORS

Provide passenger elevator(s) as needed to comply with ADA requirements. Elevators should be of minimum size and have basic, easily maintained finishes. Provide key controlled access, cab telephone, and tie-in to fire alarm system.

1. Acceptable Manufacturers: Schindler Elevator Corp., Kone, Otis Elevator Co. or ThyssenKrupp Elevator. Proposed additional manufacturers must be approved by FCS Facilities Services prior to inclusion in the specifications. Manufacturers that require proprietary tools for maintenance are not acceptable.

2. Minimum weight rating needs to be identified and included as part of the specs.

3. ADA accessibility statement needs to be included; 60” turn radius, Non-keyed controls.

4. All controls shall be open access, non-proprietary controls. See specification example included in the Appendix.

SECTION 14 4000  ADA ACCESS LIFTS

Building design should avoid the need of ADA access lifts and stair lifts if possible. Vertical lifts will be considered if ramps or other ADA acceptable devices are impractical. Angular stair lifts should be avoided due maintenance difficulties.

1. Box lifts or vertical lifts shall be utilized when elevator access to required level changes is not available.

2. Inclined lifts are not acceptable.
DIVISION 21  FIRE SUPPRESSION

SECTION 21 1300  FIRE-SUPPRESSION SPRINKLER SYSTEMS

1. All buildings shall be protected with an automatic fire sprinkler system. Sprinkler systems and other fire protection equipment shall be provided and installed in accordance with NFPA 13, current building codes, and local requirements.

2. Coordinate design of sprinkler system with design of combustible built-in furniture and storage units such as music instrument storage units.

3. Install pressure reducing stations where main water pressure fluctuates and exceeds fire protection system working pressure.

4. Smoke detector devices shall be installed in a manner that preserves accessibility.

5. All sprinkler work shall be performed by a licensed sprinkler contractor registered in the State of Georgia.

6. The Fire Marshall shall witness all underground and fire service entrance piping installations prior to cover-up.

7. The installation of the fire suppression system shall be inspected by Fulton County School’s personnel or their assigned representative during the warranty period.

8. All inspectors test and drain assemblies shall terminate at the building exterior and spill thru the wall on a splash block. Provide escutcheon cover at exterior wall penetration and caulk penetration water tight.

9. Plastic piping shall not be used in the fire sprinkler system.

10. Flexible piping shall not be used in the building fire sprinkler system.

11. The contractor shall install fire zone diagrams for each level at a minimum scale of 1" = 20' (equivalent to contract drawings) showing all fire protection system mains, valves, inspectors’ test and drain locations for each system and system zone limit lines.

11.1. Diagrams shall be mounted on plywood board under clear Plexiglas cover in a frame and posted next to the sprinkler alarm valve assembly in the main mechanical room. Posting shall be completed prior to project Final Completion and shall reflect all as-built conditions. Each diagram shall include but not be limited to the following:

11.1.1. Project name
11.1.2. Color coded zones with same zone on different level the same color
11.1.3. Legend showing sectors incorporated (referenced from architectural plans), supply riser identifier and system area (sq. ft.)
11.1.4. Riser valve location chart showing supply riser number, color code and room number (referenced from architectural plans)
11.1.5. Routing of all outside underground fire mains with hydrants shown and pipe sizes
11.1.6. Location of test-and-drain valve assembly for each zone

11.2. Provide electronic copy of fire zone diagrams to FCS Facilities in PDF format.
SECTION 22 1000 PLUMBING PIPING

1. Pipe and Fittings:
   1.1. Domestic Hot and Cold water piping inside building:
      1.1.1. Type L hard copper tube; wrought copper fittings with lead-free solder joints
   1.2. Domestic water piping exposed to view below fixtures and in kitchen areas shall be chrome plated with chrome plated escutcheon covers at walls and ceilings
   1.3. Domestic Cold water piping from street main/meter to building:
      1.3.1. Type K hard copper tube with wrought copper fittings; pipe size 2-1/2” and smaller
      1.3.2. Ductile iron pipe and fittings; pipe size 3” and larger
      1.3.3. Schedule 80 PVC pressure pipe with schedule 80 solvent weld fittings; pipe size 2-1/2” and smaller
         1.3.3.1. Install continuous #12 bare copper wire on top of pipe along entire length affixed to pipe with plastic tie straps a maximum of 4’ on center
         1.3.3.2. Install continuous buried warning identification tape 12” above top of pipe in trench
      1.3.4. All underground pressure piping shall be thrust blocked at all changes of direction and changes in elevation
      1.3.5. Saddle tees are not permitted in any portion of the underground piping system
   1.4. Sanitary Waste and Vent Piping: (kitchen fresh air waste and vent piping included)
      1.4.1. Cast iron, hub and spigot, service weight, push on joints for under slab below building pad
      1.4.2. Cast iron, no-hub pipe with cast iron no-hub fittings and heavy duty shielded no-hub stainless steel couplings for above slab inside building
      1.4.2.1. PVC pipe shall not be used for kitchen waste piping systems
      1.4.2.2. PVC pipe shall not be used in return air plenum areas
      1.4.2.3. Where piping is installed below grade outside of building pad, install continuous #12 bare copper wire on top of pipe along entire length affixed to pipe with plastic tie straps a maximum of 4’ on center from building to manhole
      1.4.2.4. Install continuous buried warning identification tape 12” above top of pipe in trench from building manhole
      1.4.3. Sanitary vent penetrations through the roof shall be located a minimum of 15 feet from any HVAC unit air intake
   1.5. Storm/Rainwater Piping:
      1.5.1. Cast iron, hub and spigot, service weight, push on joints for under slab inside building pad and below grade outside building
      1.5.2. PVC schedule 40 solid wall pipe with standard PVC DWV fittings with solvent weld joints for above slab and under slab inside building pad and below grade outside building
         1.5.2.1. Where piping is installed below grade outside of building pad, install continuous #12 bare copper wire on top of pipe along entire length affixed to pipe with plastic tie straps a maximum of 4’ on center from building to storm structure or junction box
         1.5.2.2. Install continuous buried warning identification tape 12” above top of pipe in trench from building to storm structure or junction box
      1.5.3. Cast iron, no-hub pipe with cast iron, no-hub fittings and heavy duty shielded no-hub stainless steel couplings for above slab inside building
1.5.4. Cast iron downspout boots a minimum of 18" high to be installed for all exterior aluminum downspouts piped to storm water systems below grade; install a minimum 4" yard cleanout within 3’ of each boot at grade in a minimum 12” square by 4” deep concrete pad

1.6. Natural Gas Piping:

1.6.1. Domestic, schedule 40 black steel pipe with socket welded or threaded malleable iron screwed fittings. Pipe sizes 2-1/2” and smaller

1.6.2. Domestic, schedule 40 black steel pipe with socket weld fittings; pipe sizes 3” and larger

1.6.2.1. All gas piping installed below grade shall be welded construction regardless of pipe size and pressure; minimum gas line size below grade is 1”

1.6.2.2. All metallic underground gas piping shall be wrapped and coated

1.6.2.3. Install continuous buried warning identification tape 12” above top of pipe in trench for all buried exterior gas piping regardless of pipe size and pressure

1.6.3. Delivery gas pressure downstream of gas meter shall not exceed 5 psi

1.6.4. Natural gas piping shall be designed to distribute high pressure gas across the school and regulate to the pressure required at point of service

1.6.5. Gas regulators shall be “service grade” and located outside the building

1.6.6. Gas piping shall be stepped down to required pressure at the generator

1.6.7. Install isolation valves for kitchen, generator and HVAC piping where possible

1.6.8. Where possible limit gas pressure for piping installed inside buildings to 7” W.C.

1.6.9. Install gas pressure regulators for equipment where gas pressure exceeds 11” W.C. delivery pressure

1.6.10. Galvanized pipe or pipe fittings shall not be used in gas piping systems

1.6.11. All gas piping and fittings installed exterior of the building shall be primed at the time of installation and painted yellow prior to the system being placed in service

1.6.12. Polyethylene (PE) piping with socket weld heat fusion or electro fusion joints is acceptable for exterior below grade use outside of building pads; install tracer wire and buried warning identification tape in trench with pipe

1.6.13. Pipe curb assemblies shall be installed for all gas piping penetrations thru the roof

1.7. Chemical Waste and Vent Piping:

1.7.1. No longer required in elementary and middle schools; still required in high schools

1.8. Drainage Piping Accessories:

1.8.1. Floor Drains:

1.8.1.1. Floor drains shall have a cast iron body and flashing flange with adjustable 6" round or square nickel bronze top strainer, stainless steel securing screws, sediment bucket and trap primer connection

1.8.1.2. Floor drains shall be installed in all multi-fixture toilet rooms, janitorial/custodial closets, rooms where washing machines and domestic water heaters are installed, mechanical rooms where HVAC units are installed and at emergency shower/eyewash units.

1.8.1.3. All floor drains shall have trap primers. Exception: Floor drains installed in kitchen-safe waste systems shall not have trap primers

1.8.1.4. Floor drains installed in Mechanical Rooms shall have deep seal traps

1.8.1.5. Floor drains that receive indirect waste water from sinks and equipment shall have an air gap of 2 x diameter of discharge pipe size, such as food handling equipment in the kitchen, shall use a grate with an opening or grate top option to prevent splashing

1.8.2. Wall Cleanouts:

1.8.2.1. Shall be no-hub cleanout tee with bronze countersunk plug tapped for machine screw with shallow stainless steel face-of wall access cover
1.8.2.2. Shall be roughed with centerline not more than 24" above the finished floor, but high enough for escutcheon cover to clear the baseboard
1.8.2.3. Shall be installed at the base of all sanitary waste stacks at slab on grade
1.8.2.4. Wall cleanout covers and plugs shall be removed at the final project review to demonstrate accessibility to owner

1.8.3. Floor Cleanouts:
1.8.3.1. Shall have cast iron body, adjustable round or square scoriated nickel bronze cover and rim, stainless steel securing screws and countersunk taper threaded bronze plug and sediment bucket
1.8.3.2. Cleanouts installed in carpeted areas shall have accessible top with carpet trim plate
1.8.3.3. Cleanouts in waterproofed floors or overhead slabs shall have flashing clamps
1.8.3.4. Stainless steel, Phillips head screws shall be used to secure all floor drain grates and strainer tops
1.8.3.5. Floor cleanout spacing shall not exceed 50 feet for pipe sizes 3" and smaller and 80 feet for pipe sizes 4" and larger
1.8.3.6. Water closet removal shall not be a substitution for a floor cleanout
1.8.3.7. Floor cleanout covers and plugs shall be removed at the final project review to demonstrate accessibility to owner

1.8.4. Yard Cleanouts:
1.8.4.1. Shall have tractor weight cast iron housing, stainless steel securing screws and countersunk bronze plug; cleanouts shall be set in a 16" X 16" X 6" deep poured concrete pad set flush with grade
1.8.4.2. Yard cleanout spacing shall not exceed 50 feet for pipe sizes 3" and smaller and 80 feet for pipe sizes 4" and larger
1.8.4.3. Yard cleanouts shall be installed within 5 feet of the building exterior for all sanitary sewer waste piping leaving the building. The minimum size is 4"

1.8.5. P-Traps:
1.8.5.1. P-traps for lavatories, countertop sinks, and drinking fountains shall be 17 gauge, cast brass, polished chrome plated with cleanout plug, brass nuts and deep wall escutcheon covers

1.8.6. Handicapped Covers:
1.8.6.1. All exposed lavatory and sink trim on wheelchair accessible fixtures shall be covered with a seamless cover with a vinyl insulating outer shell; insulating kits shall include covers for drain tailpiece, all P-trap components, and hot and cold water supplies

1.8.7. Floor Penetrations through Elevated Slabs:
1.8.7.1. All floor penetrations between occupied floors on elevated slabs shall be sealed watertight top and bottom and with material that will maintain the rating of the floor assembly

1.9. Domestic Water Piping Specialties:
1.9.1. Water Pressure Regulator Valves (PRV):
1.9.1.1. Bronze body construction with removable strainer, threaded or flanged connections and renewable seats; provide stainless steel spring, stainless steel adjusting screw and stainless steel screws and fasteners throughout
1.9.1.2. Flow rates and reduced pressure fall-off shall be within limits set by the applicable plumbing code. Residential type PRV valves are not acceptable
1.9.1.3. Where water pressure exceeds 100 psi, PRV valves shall be located at the street in a vault downstream of the double check valve assembly in the owner’s vault
1.9.1.4. PRV valves located in mechanical rooms that serve specific pieces of equipment shall be accessible from the floor and include bypass with manual valve

1.9.1.5. Back flow preventer shall be located at the street in a vault downstream of the main water meter vault

1.9.1.6. Preferred location of Reduced Pressure Zone (RPZ) backflow preventers shall be located on a wall within 5 feet above the finished floor with funnel drain piping routed full size to a floor drain unless exterior unit is required by the Local Authority

1.9.2. Trap Primers for Condensate Drains:

1.9.2.1. Trap primers for condensate drains shall be a solenoid type controlled by the energy management system (EMS)

1.9.2.2. Do not use pressure drop type trap primers

1.9.2.3. Trap guard type trap seal devices are not permitted

1.9.2.4. Install an isolation ball valve, union, “Y” strainer, and PRV valve upstream of trap primer solenoid valve. Set outlet pressure to 10 PSI

1.9.2.5. Trap primer valves shall be installed above accessible ceilings

1.9.2.6. Trap primer connections shall be made off of the top of the domestic water line only

1.9.2.7. Trap primers shall be installed at all floor drains except drains installed on a kitchen safe waste system

1.9.2.8. Basis of design: Precision Plumbing Products, Inc Model SP-500-24V; equal products by Jay R. Smith, Mifab, or Zurn

1.9.3. Trap Primers for Floor Drains:

1.9.3.1. Trap primers for toilet room floor drains can be a waste water type primer from a sink or lavatory

1.9.3.2. Do not install at ADA accessible fixtures where possible

1.9.3.3. Basis of design: Jay R. Smith Fig. 2698 or approved equal products by Mifab or Zurn

1.9.4. Supplies and Stops:

1.9.4.1. Supplies and stops for lavatories, countertop sinks, and drinking fountains shall be chrome plated, all brass stops with brass stems, chrome plated copper risers, loose tee key operator with deep bell chrome plated wall escutcheon with set screw; product shall comply with the SDWA (Safe Water Drinking Act) “No Lead” restrictions of ANSI NSF 61, Section 9

1.9.5. Supplies and Stops for Chemical Cleaning and Disinfecting Systems:

1.9.5.1. Provide T-fitting at cold water supply to custodial service sinks and mop receptor faucets for installation of sanitizing chemical systems; install double check valve assembly between fixture cold water isolation valve and T-fitting

1.9.5.2. Provide T-fitting at hot water supply to at kitchen dish machines for installation of sanitizing chemical feed systems. Install double check valve assembly between fixture hot water isolation valve and T-fitting

1.9.5.3. Provide T-fitting at cold water supply to kitchen pot sinks for installation of sanitizing chemical feed systems. Install double check valve assembly between fixture cold water isolation valve and T-fitting

1.9.5.4. Water taps shall be installed in all science lab prep rooms for science lab distilled/ionized water production equipment

1.9.5.5. Provide ½” CW valved tap at equipment for water treatment at kitchen steamers and combi ovens
1.9.6. Overhead Pipe Support:
   1.9.6.1. Use Clevis-type hangers; where hangers are installed on insulated piping, sheet metal pipe saddles are required at each hanger location; swivel ring and/or band type hangers are not allowed on any plumbing piping support system.

2. Plumbing System Check-Out Procedures
2.1. Designer shall establish written procedures for verifying that sanitary sewer, kitchen waste, and storm water systems are clear and installed without bellies and blockages:
   2.1.1. Remove all wall and floor cleanout covers and cleanout plugs. Lubricate and reinstall; route out lines as required.
   2.1.2. Outline procedures for video inspection of horizontal waste lines above and below floor to the exterior manhole connection:
      2.1.2.1. All lines 4” and larger and greater than 20’ in length shall be video camera inspected.
      2.1.2.2. The video inspection report shall be provided to the owner prior to final project acceptance and included as part of the close-out documentation.
      2.1.2.3. Routed lines shall be flushed from wall and/or floor cleanouts.
   2.1.3. Outline procedures for smoke testing of sanitary vent, kitchen fresh air vent and chemical vent systems within the building:
      2.1.3.1. The smoke testing report shall be provided to the owner prior to final project acceptance and included as part of the close-out documentation.
      2.1.3.2. Smoke testing shall not be done until all fixtures are operational and trap primer systems operating.
   2.1.4. Outline procedures for cleaning, sterilization, and testing of all potable water systems:
      2.1.4.1. Water samples shall be drawn and submitted to local health department for testing.
      2.1.4.2. Test reports shall be provided to the owner and included as part of the close-out documentation.
   2.1.5. Outline procedures for testing of natural gas piping systems:
      2.1.5.1. Test system piping 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.

2.2. The owner’s maintenance staff or representative shall be notified in advance of all testing and inspections.

SECTION 22 4000 PLUMBING FIXTURES

1. Basis of design: Alternate manufacturers shall be approved by FCS Maintenance Department prior to being included in the specification.
   1.2. Stainless Steel Sinks: Elkay, Just, Moen, and Kohler.
   1.3. Classroom Stainless Steel Sinks: Elkay, Just, and Moen.
   1.4. Service Sinks: Kohler, American Standard, Zurn, and Sloan.
   1.5. Mop Receptors: Kohler, American Standard, Zurn, Stern Williams, and Fiat.
   1.7. Flush Valves: Sloan, Zurn, TOTO.
   1.8. Lavatory Faucets: Chicago, Moen, Sloan, and Delta.
   1.9. Toilet Seats: Bemis, Church, and Olsonite.
   1.10. Fixture Supports: Jay R. Smith, Josam, Zurn, Wade, and Mifab.
   1.11. Countertop Sink Faucets: Moen, Zurn, Chicago, Delta, Elkay, and Just.
2. Water closets:
   2.1. Floor mounted, floor outlet, vitreous-china, white, elongated, 1.28 gallons per flush maximum water consumption, 1-1/2” top spud flush valve connection; fixture designed for flush valve operation; (wall mounted, back outlet water closets may be installed in elementary schools only)
   2.2. Provide brass floor mounting bolt hardware
   2.3. Bowl gaskets shall be a combination wax seal or urethane reinforced flanged polyethylene sleeve molded into gasket assembly
   2.4. Grout fixture base at floor

3. Urinals:
   3.1. Wall mounted 2” back outlet, vitreous-china, white, siphon jet operation, .125 gallons per flush maximum water consumption, 3/4” top spud flush valve connection; fixture designed for flush valve operation
   3.2. Waterless/water free urinals are not permitted
   3.3. Caulk fixture at wall
   3.4. For new construction, mount fixture on floor mounted carrier
   3.5. For renovation/replacement, mount fixture on existing support

4. Wall Hung Lavatories:
   4.1. Accessible, wall mounted drilled for concealed arm supports, white, cast iron fixture, nominal 20”x18” with backsplash
   4.2. Drilling as required for faucet specified
   4.3. Caulk fixture at wall
   4.4. For new construction, mount fixture on floor mounted carrier
   4.5. For renovation/replacement, mount fixture on existing support

5. Stainless Steel Sinks:
   5.1. Single or double-bowl, commercial, drop-in, 18-gauge, type 300 series stainless steel sink, size, depth and faucet drilling arrangement as scheduled
   5.2. Art room sinks shall have point of use plaster traps/solids interceptors at each sink waste under counter. Bottom access, acid resisting, 1-1/2” inlet and outlet, removable sediment bucket

6. Classroom Stainless Steel Sinks: (elementary schools only)
   6.1. Single-bowl, commercial, drop-in, 18-gauge, stainless steel sink, size, depth and faucet drilling arrangement as scheduled
   6.2. Side oriented, deck mounted cold water gooseneck faucet
   6.3. Front side oriented, deck mounted bubbler with slow closing valve; mount on opposite side of sink as faucet; bubblers attached to sinks do not count towards GDOE minimum drinking fountain requirements
   6.4. For handicapped accessible locations, select sink with waste opening centered at rear of the fixture
   6.5. Strainers shall be vandal resistant perforated grid; do not use removable strainer baskets

7. Service Sinks: Wall mounted, cast iron acid resistant enamel, white, single basin, nominal 22”x18” with blank back drilled for 8” spread faucet, stainless steel rim guard, and 3” trap standard with stainless steel strainer top at bottom outlet
   7.1. Caulk fixture at wall

8. Mop Receptors: Floor mounted, molded stone, nominal 36”x24”x10” deep with 3” drain outlet and stainless steel strainer top, stainless steel caps on curbs
   8.1. Caulk fixture at walls and floor

9. Service Sink and Mop Receptor Faucets and Accessories:
   9.1. Rough chrome plated cast brass body with brass wall brace and mounting hardware, internal check stops, cross handles, threaded brass wall flanges, brass vacuum breaker, pail hook and ¾” hose thread connection
   9.2. Provide 48” long vinyl hose with ¾” connection and wall hook
   9.3. Provide mop hanger above mop receptor units
9.4. Install check valve on each supply line above ceiling downstream of isolation ball valve

10. Water Coolers:
   10.1. Single, wall hung, stainless steel, vandal resistant push button activation with adjustable, chrome plated brass vandal resistant bubbler with keyway and shank for vandal resistant installation
   10.2. Install on floor mounted commercial carrier and backing plate supplied with unit in new construction
   10.3. Caulk fixture top at wall
   10.4. Install toggle bolts thru wall at bottom of unit
   10.5. One unit in Cafeteria shall have bottle filling station and be set at handicapped accessible height
   10.6. Hi-Lo combination water cooler units are not permitted
   10.7. Water coolers or drinking fountains shall not be installed in Gym areas with wood flooring
   10.8. Recessed wall units are not permitted

11. Flush Valves:
   11.1. Flush valves for water closets shall be manual, brass body with corrosion-resistant internal components, 1-1/2" top spud, 1.28 GPF, vandal resistant cap, control stop with check valve, vacuum breaker, copper or brass tubing, polished chrome-plated finish on exposed parts and solid ring pipe support to wall
       11.1.1. Basis of design and owner preferred:
           11.1.1.1. Owner preferred manufacturer is Sloan. Equal products by Zurn, or TOTO subject to review and approval by FCS Facility Services
       11.1.2. Automatic flush valves are not permitted.
   11.2. Flush valves for urinals shall be manual type, brass body with corrosion-resistant internal components, 3/4" top spud, .125 GPF, vandal resistant cap, control stop with check valve, vacuum breaker, copper or brass tubing, polished chrome-plated finish on exposed parts
       11.2.1. Basis of design and owner preferred:
           11.2.1.1. Sloan is the preferred manufacturer. Equal products by Zurn, or TOTO subject to review and approval by FCS Facility Services
       11.2.2. Automatic flush valves are not permitted.

12. Faucets:
   12.1. Wall Hung Lavatory – cold water only – student toilet rooms: Single deck mount, metered, ADA compliant, chrome plated, vandal resistant, with brass stem and .5 GPM vandal resistant aerator; faucet shall meet the requirements of the 2014 “Reduction of Lead in Drinking Water Act”; faucet shall have an unconditional warranty of 5 years; warranty letter shall accompany product submittals.
       12.1.1. Basis of design and owner preferred:
           12.1.1.1. Moen is preferred manufacturer; equal products by Chicago, Sloan, American Standard, or Delta subject to review and approval by FCS Facility Services
       12.1.2. Sensored faucets are not permitted.
   12.2. Wall Hung Lavatory – hot and cold water – staff/student toilet rooms at cafeteria: Dual deck mount, ADA compliant chrome plated, vandal resistant, single lever faucet with brass stems and .5 GPM vandal resistant aerator; faucet shall meet the requirements of the 2014 “Reduction of Lead in Drinking Water Act”; faucet shall have an unconditional warranty of 5 years; warranty letter shall accompany product submittals
       12.2.1. Basis of design and owner preferred:
           12.2.1.1. Moen is preferred; equal products by Chicago, Sloan, or Delta subject to review and approval by FCS Facility Services
       12.2.2. Sensored faucets are not permitted.
12.3. Countertop Stainless Steel Sink Faucets – hot and cold water – staff areas/art rooms: ADA compliant, deck mount, 8” spread faucet with single lever handle, 2.0 GPM vandal resistant aerator, three or four-hole fixture, with or without hand spray, hot and cold water indicators, chrome plated brass body and construction with ½” inlet shanks; faucet shall meet the requirements of the 2014 “Reduction of Lead in Drinking Water Act”; faucet shall have an unconditional warranty of 5 years; warranty letter shall accompany product submittals.

12.3.1. Basis of design and owner preferred:

12.3.1.1. Moen Commercial 8712/8720
12.3.1.2. Equal products by Chicago, Sloan, or Delta subject to review and approval by FCS Facility Services

12.3.2. Hose spray units shall not be installed in student accessible sink locations.

12.4. Options for student toilet room lavatories:

1.1.1. Multi-station wash fountain/lavatory systems with solid state push button metering controls (15 seconds per use) subject to review and approval by FCS Facility Services

13. Wash Fountains:

13.1. Accessible, vandal resistant, solid surface unit with integral bowl, pedestal mounted for 1 to 4 users; 0.5 GPM spray heads with air valve control, factory assembled with thermostatic mixing valve complete with check stops, strainers, and flexible stainless steel hoses concealed behind heavy gauge 304 stainless steel panels; each spray unit shall be controlled by touch time metering.

13.1.1. Basis of design and owner preferred:

13.1.1.1. Bradley Tri/Quadra-Fount model MF2933/MF2944
13.1.1.2. Equal products by Intersan or Acorn subject to review and approval by FCS Facility Services

13.1.2. Wash fountains shall not be installed in elementary schools.

14. Water closet seats:

14.1. White, commercial, molded solid plastic with open front without cover, elongated, self-sustaining check hinge with Sta-Tite commercial fastening system

15. Fixture carriers and supports:

15.1. All wall hung lavatories, urinals and drinking fountains installed in new walls or chases shall be supported independently of the wall by a commercial floor mounted carrier consisting of rectangular steel uprights with welded feet and secured to floor with lead anchor inserts or self drilling expansion shields and lag bolts at each location; wall brackets and conceal arms shall be provided where appropriate for fixture being supported. Leveling and locking hardware shall be provided for lavatory carrier concealed arm supports.

16. Hydrants:

16.1. Interior: 1/2”, chrome plated, loose tee key operated hose bib in recessed cast brass/bronze box hinged cover with vacuum breaker and 3/4”, hose connection

16.1.1. Provide at each multi stall restroom. Mount on wall below a lavatory

16.2. Exterior: Cast brass/bronze box and hinged cover with non-freeze hydrant and vacuum breaker, 3/4”, rough chrome, loose tee key operated hose bib with vacuum breaker and 3/4” hose connection.

16.2.1. Maximum spacing around perimeter of building is 150 feet

16.2.2. Mount flush with face of wall and caulk

16.3. Exterior Play Fields: Provide non-freeze protected hose bibs in key access ground boxes adjacent to all play fields. Install RPZ backflow preventer in protective accessible box above grade; where water pressure exceeds 100 psi, install a commercial PRV valve, union and isolation gate valve upstream of PRV in a meter box flush with finished grade
16.4. Roof Hydrants: Freezeless roof hydrants are required for flat roof areas where HVAC and energy recovery equipment is installed; provide one unit for each 100,000 square feet of roof area located central to equipment served

16.4.1. Basis of design and owner preferred:

16.4.1.1. Woodford Model SRH-MS
16.4.1.2. Equal products by MAPA or Jay R. Smith subject to review and approval by FCS Facility Services

SECTION 22 5000 DOMESTIC WATER HEATERS

1. General requirements:
   1.1. Hot/tempered water shall be provided for the following and other areas as required by code:
       1.1.1. Kitchens, culinary arts and food preparation areas
       1.1.2. Custodial service sinks and mop receptor faucets
       1.1.3. Adult/Staff toilet rooms
       1.1.4. Faculty workroom and break room sinks
       1.1.5. Lab demonstration and prep rooms
       1.1.6. Showers
       1.1.7. Clinic
       1.1.8. Media center sinks
       1.1.9. Art rooms
       1.1.10. Home making/family living
       1.1.11. Special Ed
       1.1.12. Student toilet rooms adjacent to cafeteria
   1.2. Use several electric water heaters sized for their point of use zones in lieu of a central heating system with a single circulating loop
   1.3. The administrative area shall have its own separate water heating system
   1.4. Kitchens shall have their own water heating system. Owner preference is gas fired, instantaneous type with sealed combustion, direct vent installed inside the building with hot water circulating system; where space conditions do not allow for instantaneous installations, a minimum of two tank type units with less than 120 gallons of storage capacity and a fuel gas input not exceeding 199,000 BTUH
   1.5. Locker rooms with student/faculty showers shall have a separate water heating system; owner preference is gas fired, instantaneous type with sealed combustion, direct vent installed inside the building with hot water circulating system
   1.6. Water heaters larger than 20 gallons shall be floor mounted; heaters 20 gallons or less may be mounted on shelves supported from masonry walls in custodial areas below ceilings above mop receptor basins or service sinks with proper support from walls and/or structure
   1.7. Provide aluminum drain pans for all electric water heaters
   1.8. Water heaters shall not be located above ceilings
   1.9. All water heaters shall be controlled by the building energy management system (EMS)
   1.10. Water heating systems serving student accessible fixtures shall be provided with 110 degrees Fahrenheit water

2. HW circulating pumps:
   2.1. Pumps shall be wall mounted no higher than 5’ above the floor for accessibility.
   2.2. Bronze body construction with screwed or flanged connections, shaft sleeves rated for water temperature range of 40-220° degrees Fahrenheit.
   2.3. All circulating pumps shall be controlled by the building energy management system (EMS).

SECTION 22 6000 PIPING IDENTIFICATION

1. Coordination:
   1.1. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied
1.2. Coordinate installation of identifying devices with location of access panels and doors
1.3. Install identifying devices before installing acoustical ceilings and similar concealment

2. Piping Identification Devices:
2.1. Manufactured pipe markers, preprinted, color-coded, with lettering indicating service, and showing direction of flow
   2.1.1. Colors: Comply with ASME A13.1, unless otherwise indicated
   2.1.2. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow
   2.1.3. Self-adhesive pipe markers not acceptable
   2.1.4. Plastic tape not acceptable
   2.1.5. Manufacturers: T&B/ Westline, Seton, MSI (Marking Services, Inc.), Brimar Identification & Safety Products, Brady Worldwide, Inc.

2.2. Band and letter sizes shall conform to the following table:

<table>
<thead>
<tr>
<th>O.D. of Piping Covering:</th>
<th>Width of Color Band</th>
<th>Size of Letter/Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot; and smaller</td>
<td>6&quot;</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>1/4&quot; to 2&quot;</td>
<td>8&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>2-1/2&quot; to 6&quot;</td>
<td>12&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>8&quot; and larger</td>
<td>18&quot;</td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

2.3. Band legend and color and letter color shall conform to the following table:

<table>
<thead>
<tr>
<th>Piping</th>
<th>Band Legend</th>
<th>Letters</th>
<th>Band Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Potable Water</td>
<td>NPW</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>G</td>
<td>Black</td>
<td>Yellow</td>
</tr>
<tr>
<td>Medium Pressure Gas</td>
<td>MPG</td>
<td>Black</td>
<td>Yellow</td>
</tr>
<tr>
<td>Domestic Cold Water</td>
<td>CW</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>Domestic Hot Water</td>
<td>HW</td>
<td>Black</td>
<td>Yellow</td>
</tr>
<tr>
<td>Domestic Circulating</td>
<td>HWC</td>
<td>Black</td>
<td>Yellow</td>
</tr>
<tr>
<td>Sanitary Waste Drain</td>
<td>W</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>Sanitary Soil Drain</td>
<td>S</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>Sanitary Vent</td>
<td>V</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>Sprinkler Piping</td>
<td>SPK</td>
<td>White</td>
<td>Red</td>
</tr>
<tr>
<td>Rainwater/Downspouts</td>
<td>DS</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>Overflow Drain Piping</td>
<td>OFD</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>Chilled Water Supply</td>
<td>CWS</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>Chilled Water Return</td>
<td>CWR</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>Hydronic Hot Water Supply</td>
<td>HWS</td>
<td>Black</td>
<td>Yellow</td>
</tr>
<tr>
<td>Hydronic Hot Water Return</td>
<td>HWR</td>
<td>Black</td>
<td>Yellow</td>
</tr>
<tr>
<td>Condensate Drain</td>
<td>DRAIN</td>
<td>White</td>
<td>Green</td>
</tr>
</tbody>
</table>

2.4. Valve Tags
2.4.1. Valve tags: Stamped or engraved with 1/4" letters for piping system abbreviation and 1/2" numbers, with numbering scheme. Provide 5/32" hole for fastener
2.4.2. Material: 19 gauge minimum brass, 1-1/2" minimum size
2.4.3. Valve-tag fasteners: S hooks or jack chain
2.4.4. Manufacturers: T&B/ Westline, Seton, MSI (Marking Services, Inc.), Brimar Identification & Safety Products, Brady Worldwide, Inc.

2.5. Valve-Tag Installation

2.5.1. Valve-tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following:

2.5.1.1. Valve-tag size and shape:

<table>
<thead>
<tr>
<th>IDENTIFICATION SYSTEM</th>
<th>SHAPE</th>
<th>NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold Water (Domestic)</td>
<td>Round</td>
<td>CW-1,2,3...</td>
</tr>
<tr>
<td>Hot Water (Domestic)</td>
<td>Round</td>
<td>HW-1,2,3...</td>
</tr>
<tr>
<td>Hot Water (Heating)</td>
<td>Round</td>
<td>HW-1,2,3...</td>
</tr>
<tr>
<td>Chilled Water Piping</td>
<td>Round</td>
<td>CW-1,2,3...</td>
</tr>
</tbody>
</table>

2.5.1.2. Each valve tag shall be attached to the hand wheel or lever handle with S hooks or jack chain.

2.5.1.3. A valve chart, framed under glass and wall mounted, shall be located in the main mechanical room and shall list each valve by identification number, its location in the piping system - (i.e., hot water, fire main, water heater, etc.) and its function - (i.e., shut-off, balancing, drain, etc.).

2.5.1.4. All ceiling tiles which provide access to valves shall be identified with a color coded valve identification number in black affixed to the permanent ceiling grid immediately below the valve. Tag shall be ¾" diameter minimum

- Domestic cold water – blue
- Domestic hot water and hot water recirculating – red
- Natural gas – yellow
**SECTION 23 0000 HVAC SYSTEMS**

1. **Space Requirements:**
   1.1. HVAC System Requirements by Space:

<table>
<thead>
<tr>
<th>Type of Space</th>
<th>HVAC Requirement</th>
<th>Special Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom</td>
<td>Water Source Heat Pumps</td>
<td></td>
</tr>
<tr>
<td>Administrative Offices</td>
<td>Packaged HVAC Equipment with Variable Volume Terminal Units</td>
<td>Offices, reception work and conference rooms shall be on independent controlled, separate zones.</td>
</tr>
<tr>
<td>Counseling Suite</td>
<td>Packaged HVAC Equipment with Variable Volume Terminal Units</td>
<td>Offices, reception and conference rooms shall be placed on independently controlled, separate zones.</td>
</tr>
<tr>
<td>Media Center Suite</td>
<td>Packaged HVAC Equipment with Variable Volume Terminal Units</td>
<td>Office, work and conference rooms shall be placed on independently controlled, separate zones.</td>
</tr>
<tr>
<td>Cafeteria</td>
<td>Packaged HVAC Equipment</td>
<td></td>
</tr>
<tr>
<td>Cafeteria Managers Office</td>
<td>Ductless Split System with Heating and Cooling</td>
<td>Local thermostat and enabled/disabled by the energy management system (EMS)</td>
</tr>
<tr>
<td>Kitchen</td>
<td>Packaged HVAC Equipment</td>
<td></td>
</tr>
<tr>
<td>Dry Storage</td>
<td>Single Zone Packaged HVAC Equipment or Ductless Split System with Heating and Cooling</td>
<td>Maximum indoor design temp of 70F must be year-round.</td>
</tr>
<tr>
<td>Auditorium</td>
<td>Packaged HVAC Equipment</td>
<td></td>
</tr>
<tr>
<td>PE Areas including Gyms</td>
<td>Packaged HVAC Equipment</td>
<td></td>
</tr>
<tr>
<td>Locker Rooms</td>
<td>Packaged HVAC Equipment</td>
<td></td>
</tr>
<tr>
<td>Stadium Press Boxes</td>
<td>Ductless Split System Heating and Cooling</td>
<td>Local thermostat and enabled/disabled by EMS</td>
</tr>
<tr>
<td>Network Server Rooms to include video surveillance equipment (MDF and IDFs)</td>
<td>Ductless Split System Heating and Cooling</td>
<td>Local thermostat and enabled/disabled by EMS. Tied into the emergency generator. Requires 24-7-365 control</td>
</tr>
<tr>
<td>Telephone Equipment Room</td>
<td>Ductless Split System with Heating and Cooling</td>
<td>Local thermostat and enabled/disabled by EMS. Tied into the emergency generator. Requires 24-7-365 control</td>
</tr>
<tr>
<td>Corridors</td>
<td>Water source heat pumps (WSHP)</td>
<td>Use WSHP with additional ceiling mounted electric heater at entry doors.</td>
</tr>
</tbody>
</table>

(Updated February 27, 2015)
1.2. Special Instructions:

1.2.1. All HVAC units shall be controlled and monitored by the EMS. Local thermostats only when approved; manufacturer of equipment to provide safeties and timers.

1.2.2. Design professional to coordinate the EMS controls requirements with the HVAC equipment.

1.2.3. Alternate HVAC systems outside the design requirements need to be approved by FCS prior to developing the design documents.

1.2.4. Provide HVAC emergency shutdown button in administration area.

1.2.5. Designers are to develop plans and specifications that preserve manufacturers recommended service clearances around all HVAC equipment.

1.2.6. The education specifications require that certain classrooms shall be capable of being subdivided into two smaller rooms. The HVAC system and controls for these classrooms shall be designed to operate properly as a single large classroom or as two smaller classrooms. If two separate units and thermostats are provided, they shall be designed to operate as a single unit for the single large classroom.

1.2.7. Design engineer shall clearly identify the ambient and space design temperatures used for winter and summer conditions prior to design development.

1.2.8. All HVAC units shall have ducted returns. Corridors, stairs and elevator spaces shall be pressurized.

1.2.9. Front entrances which are served by a RTU VVT unit shall use parallel PIU boxes with electric heat.

1.2.10. Isolated rooms located along the building perimeter and served by a predominately interior RTU VVT unit shall use parallel PIU boxes with electric heat.

1.2.11. All HVAC units shall be charged with R410A refrigerant.

1.2.12. ERU supply ductwork shall be insulated and run outside of corridor ceiling cavity to preserve hall mounted HVAC unit service access.

1.2.13. Locker room air conditioning and ventilation shall be designed to address the special conditions in these spaces. Provide ionization units to assist in odor control that is problematic in most existing schools.

1.2.14. Locate zone temperature sensor on an interior wall, close to the return grill and at adult ADA height.

1.2.15. On renovation projects, the HVAC demolition plans should include provisions to remove all abandoned equipment and be coordinated with architectural plans to ensure building finishes are restored.

1.2.16. On renovation projects when feasible roof top equipment should include new roof curbs in lieu of adapter curbs.

1.2.17. Roof curbs to provide a minimum of 8” of flashing height above the roof.

1.2.18. Design documents to require contractor to change filters during construction and extend service through the warranty period.

1.2.19. New construction and major HVAC renovation projects will be independently commissioned. Designer to confirm with FCS if a renovation project will be commissioned and include provisions in design documents to inform contractor of any special commissioning requirements. Responsibility for test and balance procedures is to be identified during the design process.

1.2.20. Design to consult with FCS Facilities to determine if building location will necessitate heightened air filtration requirements.

1.2.21. All air distribution systems shall be designed for a maximum occupant sound level of 35 NC. Lower levels shall be provided for sound sensitive areas such as music and media.

1.2.22. The use of ionic air cleaners is required in order to reduce the quantity of outside air unless restricted by code or needed to maintain building pressure.

2. Equipment Requirements:

2.1. Water Source Heat Pumps:

2.1.1. Approved manufacturers are Carrier, Trane, and Climatemaster.
2.1.2. Specifications for water source heat pumps shall require units to be resettable from EMS by disabling the fan or compressor.

2.1.3. Water source heat pumps shall be extended range type with expansion valves. Units to operate on a minimum entering air temperature in heating mode of 40°F with a minimum entering water temperature of 20°F and a maximum entering water temperature of 110°F. Cap tubes not acceptable.

2.1.4. Connections to the loop piping shall be on the side or top.

2.1.5. Provide ball type isolation valves and automatic flow control valves to all water source heat pumps.

2.1.6. The filter rack to be 2” and configured with an air tight seal, continuous hinged access doors and tool-less quarter turn latches. Include MERV-8 filters.

2.1.7. No external condensate pans.

2.1.8. Condensate control to be provided by float switch in the primary pan of the WSHP.

2.1.9. Provide monitoring output for pressure and condensate alarms.

2.1.10. Solenoid valve for condenser water shall be controlled by EMS. Use separate output from compressor.

2.2. Packaged Equipment:

2.2.1. Approved manufacturers are Trane, Carrier and Lennox.

2.2.2. Provide criteria for “burn-in” of gas heat exchangers in Project Manual. Force unit to run all gas heat stages at least 20 minutes. Coordinate schedule with principal at schools.

2.2.3. Units are to be gas heat unless gas is not on site.

2.2.4. Provide differential enthalpy controls for economizer.

2.2.5. All access doors are to be continuous hinged with quarter turn tool-less entry (include a lockable option if available – key lock is preferred).

2.2.6. Provide hail guards on all rooftop equipment.

2.2.7. All interior piping to rooftop units shall come through the roof curb.

2.2.8. Packaged Equipment with VVT units shall have constant speed with bypass damper.

2.2.9. All units shall have the ability to dehumidify the space.

2.2.10. All outside air to pass through Merv 8 filters unless adjacent to highway or other fine particulate sources of pollution. For outside air in areas of high pollution, equipment may require up to Merv 13 filters.

2.3. Variable Volume Terminal Units:

2.3.1. Units to be pressure independent

2.3.2. Provide flow monitoring

2.3.3. Unit to be controlled by EMS

2.4. Power Induction Units (PIU):

2.4.1. Use parallel PIU boxes

2.4.2. When electric heat requirement is greater than 3 kW, use multiple stages

2.4.3. Ensure that return air is pulled from space served by PIU

2.5. Ductless Split Systems:

2.5.1. Approved manufacturers are: Mitsubishi, Daikin, and Sanyo

2.5.2. Shall be installed over the door

2.5.3. Factory filtration is acceptable on these units

2.5.4. Condensate pumps shall be sump-type, external to the unit

2.5.5. Tie condensate pump to unit so unit will stop cooling if condensate pump fails

2.5.6. Provide wind baffles with condenser unit to allow for low ambient operation (down to 0°F)

2.5.7. Use wired thermostat

2.5.8. Include hardware option to allow enable/disable by EMS

2.6. Ionization Units:

2.6.1. Approved manufacturers are Global Plasma, Bioclimatic and Plasma Air

2.6.2. Use needlepoint type
2.6.3. Provide alarm contacts for EMS

2.7. Energy Recovery Units:
2.7.1. Approved manufacturers are AAON, Addison and Munters
2.7.2. Units are to be gas heat unless gas is not available on site
2.7.3. Supply duct from ERU to be tied into WSHP return air duct before filter
2.7.4. Provide hail guards
2.7.5. Access doors to be continuous hinged with quarter turn tool-less entry (include a lockable option if available – key lock is preferred)
2.7.6. ERU’s to allow for the recirculation of return air
2.7.7. Provide air flow monitoring with output to EMS
2.7.8. All outside air to pass through Merv 8 filters unless adjacent to highway or other fine particulate sources of pollution; for outside air in areas of high pollution, equipment may require up to Merv 13 filters

2.8. Kitchen Hoods:
2.8.1. Approved manufacturers are Duo-Air, Greenheck, and Gaylor
2.8.2. Kitchen Hood shall be a double shell design, constructed of stainless steel, consisting of an inner exhaust canopy with minimum 86% supply air ratio. See Division 11 – EQUIPMENT for food service equipment.
2.8.3. Hood shut-down shall be located on the hood
2.8.4. UDS under the hood is required
2.8.5. Kitchen hoods are not to include heat

2.9. Cooling Towers:
2.9.1. Approved manufacturers are Evapco, BAC, Marley
2.9.2. Cooling towers shall be constructed of all stainless steel or poly cast material
2.9.3. Select low-noise cooling towers
2.9.4. Provide ladder and davit for access to cooling towers
2.9.5. Water meters need to be included on all cooling tower make-up water lines
2.9.6. Water level controller shall control feed solenoid and provide low and high water alarms for EMS. Level controller shall be freeze protected. Solenoid shall be mounted in heated space with service valve upstream.
2.9.7. Cooling towers need to be vertical discharge
2.9.8. Makeup water piping connection shall be in the mechanical room

2.10. Pumps:
2.10.1. Approved manufacturers of water loop pumps are Bell and Gossett, Taco, and Armstrong
2.10.2. Tower and loop pumps to be 1750 rpm
2.10.3. Flexible coupled pumps shall be laser aligned
2.10.4. Condensate pumps, if needed, shall be external sump-type and wired to cut-off unit if cooling

2.11. Variable Frequency Drives (VFD):
2.11.1. Approved manufacturers are ABB (preferred), General Electric and Siemens
2.11.2. VFDs on tower fans and loop and cooling tower pumps shall be required
2.11.3. VFD to be located within the mechanical room
2.11.4. VFDs to be stand-alone type, not motor control center type
2.11.5. VFDs to be controlled by EMS and include remote controlled bypass and manual controls
2.11.6. VFD’s to be monitored by EMS via Modbus
2.11.7. All motors associated with VFD installations shall be rated for inverter duty

2.12. Boilers:
2.12.1. Approved manufacturers are AERCO, Hydrotherm, or Patterson Kelley Mach
2.12.2. Boilers shall be true condensing-type
2.12.3. Include condensate neutralization tanks
2.12.4. Discharge water setpoint to be reset by EMS via hard wire
2.12.5. Boiler monitoring via Modbus
2.12.6. Provide a minimum of two boilers to meet full load requirements

2.13. Heat Exchanger:
2.13.1. Approved manufacturers are Sondex, Alpha Laval or Mueller
2.13.2. Heat exchangers shall be of stainless steel construction with shroud around the plate pack
2.13.3. Isolation valves, bypass and drain valves shall be installed on each heat exchanger. The piping system shall be designed to allow full operation of the water loop without the heat exchanger.
2.13.4. Provide strainers on inlets
2.13.5. Include four permanent insertion thermometers on outlets and inlets
2.13.6. Provide one piece clip-on molded nitrile rubber gasket between plates
2.13.7. Heat transfer performance to be ARI certified

2.14. Electric Ceiling or Cabinet Heaters:
2.14.1. Should have integral thermostats and enabled/disabled by EMS
2.14.2. Ceiling location is preferred whenever possible

2.15. Exhaust Fans:
2.15.1. Exhaust fans to be direct drive
2.15.2. Exhaust fans to be enabled and disabled by EMS
2.15.3. Art suite and science labs shall exhaust directly to the exterior
2.15.4. In science labs, provide dedicated exhaust fan over demonstration tables with local switch (non-hold timer)
2.15.5. Art suite kiln room requires down draft fan, exhaust hood and exhaust fan. Interlock exhaust fan with kiln operation to provide time delayed shutdown. Kiln exhaust to be coordinated with the installation of the kiln (supplied by GC).
2.15.6. Dark Room ventilation shall be designed to address the special conditions in these spaces

2.16. Flow Controls and Balancing Valves:
2.16.1. Preferred manufacturers for supply and return line valve assemblies: Flow Design, Inc., Griswold, Bell & Gossett, Nexus and Pro-Hydronic

2.17. Energy Management Systems:
2.17.1. Approved vendor is Automated Logic Company
2.17.2. Provide automated direct digital control system
2.17.3. Control points list shall be FCS standard. Any addition or deletion of points only by approval by FCS

3. Piping
3.1. Condensate Piping:
3.1.1. Interior condensate pipe needs to be copper
3.1.2. Exterior condensate piping to be CPVC schedule 80, painted for UV protection and piped to roof drain or rain gutter
3.1.3. Identify and show locations of interior condensate lines
3.1.4. Provide a drain location for interior condensate. Provide trap primer enabled/disabled by EMS.
3.1.5. The maximum length of condensate pipe run for FCUs and WSHP without a vertical hub drain shall be 50’
3.1.6. Use a gravity drain at ¼” per foot for the condensate lines; avoid condensate pumps

3.2. Hydronic Piping:
3.2.1. In closed loop hydronic system makeup water feed shall be after the PRV
3.2.2. Provide air/dirt separators in all closed loop piping systems. Units shall have a coalescing filter/sePARATOR with 100% air removal and 80% efficiency for all particles 30 microns and larger within 100 passes.
3.2.3. Design documents shall require that the water treatment system be installed and working prior to HVAC equipment start-up and throughout all functional testing. HVAC system shall not be operated without water treatment
3.2.4. Designer to include the flushing of the piping loop and cleaning of strainers prior to connection of water source heat pumps for protection of internal heat exchanger

3.2.5. Designer to include open pipe loop filtration system with preferred location in mechanical room

4. Chemical Treatment for Piping System:

4.1. Acceptable vendors: Nalco, Garrett Callahan, current FCS service contractor

4.2. The water treatment chemical and service supplier shall be a recognized specialist, active in the field of industrial water treatment for the last ten (10) years, whose major business is in the field of water treatment

4.3. Controls:

4.3.1. System controlled by EMS
4.3.2. Conductivity sensor shall be by Burkert
4.3.3. 8222 standard transmitter, constant 1.0, Burkert part 559638
4.3.4. Display programming module, Burkert part 559168
4.3.5. Insertion tee, Burkert part 56069.2
4.3.6. Additional hardware to match standard detail for switched outlets with override, flow switch, etc., to make a functioning system
4.3.7. Provide plastic backboard for mounting chemical treatment equipment

4.4. Pumps:

4.4.1. Plug-in Walchem-type with electronic flow adjustments

4.5. Chemicals:

4.5.1. Daily Biocide - Stabilized liquid bromine (Formula 3388 for Garrett Callahan, or equal)
4.5.2. Weekly biocide - Broad spectrum, non-foaming microbiocide, Isothiazoline (Formula 315 for Garrett Callahan, or equal)
4.5.3. Inhibitor - Organic scale and corrosion inhibitor type (Formula 2010-Z for Garrett Callahan, or equal)

4.6. Coupon Rack:

4.6.1. Mild steel and copper corrosion coupons

4.7. Meters:

4.7.1. Seametrics MJR meter or equal by Carlon
4.7.2. Two meters - One for makeup, one for blowdown
4.7.3. One (1) gallon per pulse
4.7.4. Must be mounted horizontal with register facing up

4.8. Service:

4.8.1. Contractor to provide monthly visits and chemicals through the warranty period
4.8.2. One coupon test during first year

5. Energy Management System:

5.1. Input/output data points: request up-to-date points list from FCS facilities staff
DIVISION 24 AND 25 – NOT USED

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SECTION 26 0100  OPERATION AND MAINTENANCE OF ELECTRICAL SYSTEMS

1. Non-Revenue Grade Power Metering:
   1.1. Provide non-revenue grade power metering on interior lighting panels for new construction projects or where new lighting panels are being installed
   1.2. Connect meters to building automation system via Modbus in order to allow remote analysis of energy use and waste
   1.3. Provide sub-metering as required by ASHRAE 90.1

2. Switchgear:
   2.1. Designer to include surge protection requirements as specify by manufacturer
   2.2. Manufacturer shall provide commissioning service to ensure equipment has been installed as specified

3. Solid Front Electrical Panels:
   3.1. Electrical panels shall be located in designated electrical or mechanical rooms or other spaces not accessible to students such as kitchens
   3.2. Electrical panels to have solid hinged fronts to provide access to wiring without completely removing the front cover – door in door type panel. This applies to both surface and flush mounted panels
   3.3. Add surge protection devices to all panels.
   3.4. All panels to have an arc flash study with shock ratings clearly marked on the panel

4. Future Expandability:
   4.1. The building electrical service shall be designed to accommodate future loads for building expansion and future portable classrooms. (See Introduction – Core Capacity and DIVISION 32 – Future Portable Classrooms) A “spare” breaker shall be installed in the main electrical room for a future distribution panel near the portable site(s), to provide electrical service to the portables. A 2 ½” conduit is required to serve the remote future portable classroom distribution panel. It shall be installed from the main electrical distribution panel to the predetermined location of the future panel and capped until needed. Intercom, security and other systems shall be expandable for the number of additional portable classrooms noted above.

5. Conductors and Grounding:
   5.1. Aluminum wiring shall not be used on the building side of the meter.
   5.2. Plenum-rated low-voltage cabling may be used in lieu of conduit, if cost effective. Provide hooks in hallways for low voltage cabling. Low voltage cable shall not be installed resting on ceiling tile and grid.
   5.3. Conduit shall be run in a manner that preserves service access to all adjacent equipment.
   5.4. MC cable is not acceptable for branch circuits.
   5.5. Install eight 2 ½” conduits with pull wire for power service to future portable classrooms. Provide GRS conduit where routed beneath parking lots or drives. Provide a concrete or composite pull box flush with grade with a top and bottom. The top of the box shall be permanently marked “Electric Service for Portables.” Cap all conduits inside the box for future use and seal all penetrations. Size of pull box and depth of conduit shall be per NEC. Provide conduit sleeves on opposite side of conduit penetrations for future use. Cap conduit sleeves.
   5.6. Conduit for low voltage wiring to portables is not required. We run all low voltage above ground on top of canopies.

6. Overload Devices for Motor Starters:
   6.1. Motors shall be equipped with a solid state overload protection device with an adjustable trip point rather than thermal overloads.
   6.2. Provide phase protection devices on all motor rotating equipment.
7. Power Outlets:
   7.1. Provide at least one 110 volt duplex outlet on each wall and an average of one per 8’ of wall except in cafeteria and gymnasium.
   7.2. Provide at least one 110 volt dedicated duplex outlet for each designated computer outlet. (One 4-plex outlet for each pair of computer outlets)
   7.3. In corridors, provide dedicated circuit for power outlets. Outlet should be on 25’ centers.
   7.4. Provide one 110 volt GFI duplex outlet adjacent to each sink counter except in student restrooms.
   7.5. Provide special voltage outlets for designated equipment such as large printer/copy machines and other special equipment.
   7.6. Outlet covers to be jumbo sized ivory color. Blank receptacle plate covers to be stainless steel.
   7.7. Outlets backed up by generator shall be red.
   7.8. Low voltage data and telecom outlets to be blue.
   7.9. All isolated ground outlets to be orange.

8. Motion Sensors:
   8.1. On new construction projects, all unoccupied spaces (i.e. supply, storage, hallways, breakrooms, etc.) shall be equipped with motion sensors that will automatically turn off the lights and place the switch in the off position when the room is unoccupied. Exclude mechanical, electrical and data closets.
   8.2. Connect motion sensors to HVAC control system.
   8.3. Review characteristics of the system and possible additional rooms to be included with FCS Executive Director of Facility Services for approval prior to incorporation into the construction documents.

9. Emergency Electrical System: All FCS shall be equipped with an automatic emergency electrical generation system. The system shall include, but shall not be limited to, a natural gas engine and electrical generator with vibration control, automatic engine starting system with batteries, instrument panel, weather-protective housing, annunciator panel, exhaust silencer, accessories and the frame grounded to the earth.
   9.1. The system shall be sized for and be connected to the following:
      9.1.1. Sanitary sewer pump stations if school is so equipped
      9.1.2. Emergency lighting fixtures (battery pack lighting fixtures are not acceptable)
      9.1.3. Fire alarm system
      9.1.4. Intercom system
      9.1.5. Telephone system
      9.1.6. Intrusion detection system
      9.1.7. Security camera system
      9.1.8. Energy management main panel
      9.1.9. Walk-in freezer and cooler
      9.1.10. Outlets for serving line cash registers
      9.1.11. Main telephone-MDF-IDF-security camera rack room(s) and their stand-alone air conditioning units
      9.1.12. Elevators – (where applicable) to achieve at least one elevator access to each level.
   9.2. Some of the electronic loads listed above also need to have a small UPS/surge protector to carry the electrical loads from the point of power interruption through start-up of the generator. Specifically, the intercom system, the telephone system switch and energy management system main panel need to be served in this manner.
      9.2.1. Normal/emergency generator outlets shall be color coded/placarded in accordance with NEC.
      9.2.2. The generator control panel shall be provided with two Modbus connection points, one to supply data to the remote annunciator (located in the front office) and one to supply data to the building energy management. The connections shall use the Modbus RTU-2 protocols. The data transmitted to the building energy management system shall be the same as transmitted to the remote annunciator plus any additional data made available by the manufacturer.
      9.2.3. Provide factory start-up and testing of the system including a load test. This testing shall include coordination with the building energy management system and confirmation that the required data is being properly transmitted.
      9.2.4. Generator will have contacts for EMS monitoring of “trouble” and “run” signals.
9.2.5. Generator installation to include a grounding rod

10. Light Fixtures

10.1. The interior lighting design shall minimize fixture types and incorporate standardized lamp inventory to the extent practicable. T-8 U-tubes are unacceptable.

10.2. General interior lighting shall be provided by recessed 2’ x 4’ fluorescent fixtures with T-8 lamps and electronic ballasts. A safety cable should be attached to the fixture, cover reflector and lens.

10.3. Standard acrylic lenses should suffice for most locations.

10.4. Polycarbonate lens are recommended for low ceilings in corridors, stairs and locker rooms.

10.5. Storage areas, mechanical and electrical rooms should have metal cage protection.

10.6. Locker rooms near showers and kitchens should have gasket type vapor proof lenses.

10.7. Electrical, mechanical and data equipment rooms shall have LED light fixtures on switches.

10.8. The use of incandescent fixtures or dimming electronic ballasted fixtures shall be limited to special uses, such as theatrical lighting.

10.9. Typical classrooms, labs and other Instructional shall have standard three-tube fixtures.

10.10. Media centers, cafeterias, and other spaces with ceiling heights above 12 feet shall have fluorescent pendant fixtures.

10.11. Typical classrooms, labs, Media Centers, other Instructional spaces and Cafeterias shall have multilevel switching to allow one, two or three lamps per fixture to be turned on by two switches (not by dimmers) to produce 33%, 66% and 100% lighting levels. In classrooms and lab spaces a third switch shall be installed to turn off lights at front wall during AV presentations.

10.12. Tandem wiring of fixtures is encouraged to reduce the number of ballasts.

10.13. LED lighting preferred for high and inaccessible locations.

10.14. LED lighting is to be used in all interior and exterior can lights.

10.15. Stairwell lighting should be provided by wall pack fixtures at a minimum height of 12’. Lighting should be installed over landings. LED’s are preferred.

10.16. When replacing exterior light fixtures designer to match lamp temperature with remaining exterior fixtures. LED fixtures are preferred. If LED fixtures cannot cost effectively match existing color temp provide alternative fixture or recommend replacement of remaining fixtures.

11. Gym Lighting:

11.1. Provide multi-level lighting at all gyms by means of switching, not dimming.

11.2. Competition gyms shall have multi-level lighting for recreational use and competition use at 80fc per athletic association requirements.

11.3. Gym lighting fixtures shall be T-5 High Output (HO) or induction type, with instant-on feature, in lieu of metal halide fixtures (previous edition of FCS guidelines).

11.4. Gym lighting fixtures shall be standardized for cost efficiency to the extent possible.

11.5. Gym lighting fixtures shall have fixture, lens, guard and safety chains to prevent these components from falling when damaged by impact. All gym lighting fixtures shall be rated for medium duty.

12. Theatrical Lighting Systems: Stage, drama and broadcast video labs shall be equipped with performance lighting which shall be incorporated into the scope of work for all new school projects.

12.1. Architects shall be responsible for employing a qualified professional lighting designer to develop appropriate design and construction documents.

12.2. Drawings and specifications shall be submitted to FCS Drama Coordinator and Facilities Services for review and approval.

12.3. Scope of work shall include overhead pipe grid, dimmable theatrical light fixtures, wiring and control system.

12.4. Provide separate fluorescent work light system.

12.5. High school auditorium front overhead stage lighting shall be catwalk mounted. Drop light mounting is unacceptable.

12.6. See Division 11 EQUIPMENT- Theatrical/Stage Equipment for Catwalk assess for stage lighting.

12.7. Auditoriums shall be equipped with dimmable LED house lights.

13. Exit and Emergency Lighting:
13.1. Place all emergency lighting fixtures on the generator; battery back-up is not acceptable.
13.2. Red LED fixtures shall be utilized for exit lighting.

14. Exterior Lighting Fixtures: Provide adequate exterior lighting at building parking and walkway areas (for security to employees and building). Fixtures shall be energy efficient and vandal resistant with rectangular lenses, similar to “Wal-Pak” series as manufactured by Lumark with an LED HPS lamp. Exterior fixtures shall be controlled by building automation system with local overrides. See Table 26-1 for lighting levels.
14.1. All exterior lighting shall be controlled by EMS astrological clock with local override switch.
14.2. Divide controls for site lighting into multiple zones (parking, canopy and building at a minimum) that can be operated independently. Submit design for zones to FCS for review and approval.
14.3. Local override shall be momentary contact switch tied to building automation system.
14.4. Photocells shall not be acceptable exterior lighting controls.

15. Sports Field Lighting: The architect shall develop complete drawings and specifications to describe sports field lighting similar to those currently installed at existing Fulton County high schools.
15.1. Sports lighting shall be provided at the following fields:
   15.1.1. Football/track stadium: 360’ x 160’
   15.1.2. Baseball field: 330’ x 380” x 330’ plus batting cage area
   15.1.3. Softball field: 200’ x 200’ x 200’ plus batting cage area
15.1.4. Environmental light control:
   15.1.4.1. Primary goal is to not negatively impact the adjacent community with excessive spill light and glare.
   15.1.4.2. Provide maximum spill and glare control. The specifications shall require a photometric report from an independent or certified testing lab certifying that the luminous intensity from any one fixture does not exceed the following criteria:
      15.1.4.3. Football/track stadium: 12,000 candela at 84 degrees above nadir
      15.1.4.4. Baseball field: 12,000 candela at 83 degrees above nadir
      15.1.4.5. Softball field: 12,000 candela at 83 degrees above nadir
15.2. Life Cycle Cost:
   15.2.1. The preferred lighting system shall be energy efficient and cost effective to operate.
   15.2.2. Maximum energy consumption based on 5,000 hour operating cycle:
      15.2.3. Football/track stadium: 105.0 kWh or less.
      15.2.4. Baseball field: 77.0 kWh or less.
      15.2.5. Softball field: 33.0 kWh or less.
   15.2.6. Include, in the bid, one set of replacement lamps rated at 5,000 hours or two sets if rated at 3,000 hours. Also, include preventative and spot maintenance (parts and labor) for 25 years. Coordinate details of FCS requirements for remote controls and incorporate those requirements into the specifications.
15.3. Guaranteed Light Levels:
   15.3.1. Selection of appropriate light levels impact the safety of the players and the enjoyment of spectators. Therefore, the lighting system shall be designed such that the light levels are guaranteed for a period of 25 years. Each manufacturer shall provide, along with bid, a recommended lamp maintenance schedule required to provide guaranteed light levels for 25 years.
      15.3.2. Football/track stadium: 50 footcandles
      15.3.3. Baseball field (infield): 50 footcandles
      15.3.4. Baseball field (outfield): 30 footcandles
      15.3.5. Softball field (infield): 50 footcandles
      15.3.6. Softball field (outfield): 30 footcandles
      15.3.7. Architect shall develop detailed specifications for measuring the uniformity of these basic standards.
15.4. **Basis of design**: Musco’s Light-Structure Green System. All substitutions must provide a complete submittal package at least 10 days prior to bid. Provide special manufacturing if necessary to meet specifications based on the Musco standards.

15.5. **Lighting system must be designed to comply with current applicable building codes and minimum 100 mph wind speed. Crossarms shall be designed to withstand minimum 150 mph winds and maintain luminaire aiming alignment.**

15.6. **All components shall be designed as a system and shall include, but not be limited to:**
   - 15.6.1. Galvanized steel poles with climbing steps and safety harness
   - 15.6.2. Pre-cast concrete foundation with concrete backfill or concrete anchor bolt type foundation
   - 15.6.3. Exposed steel minimum 18" above grade
   - 15.6.4. Direct buried steel poles will not be permitted.
   - 15.6.5. Concrete or other single piece poles requiring use of heavy equipment that may damage the site will not be permitted
   - 15.6.6. All exposed components shall be designed of appropriate corrosion resistant materials.
   - 15.6.7. Die-cast aluminum housing for luminaire reflector system
   - 15.6.8. Remote ballast, capacitors, fusing and safety disconnects for luminaries shall be located in an aluminum enclosure on each pole approximately 10’ above grade
   - 15.6.9. Wire harness system designed for trouble-free installation
   - 15.6.10. Lightning protection
   - 15.6.11. UL listed components
   - 15.6.12. Momentary power interruption illumination system during failure of primary system
   - 15.6.13. Specifications shall describe an appropriate standard for measuring compliance of the installed system and requirements for correcting non-compliance.

15.7. **Light Level Requirements** – Where light levels are not specified for spaces, latest design standards from the Illuminating Engineering Society of North America (IESNA) should be used.
DIVISION 27 COMMUNICATIONS

SECTION 27 1500 COMMUNICATIONS CABLING

1. Data Cabling System: Provide Data Cabling System for computer network and equipment in accordance with the current Fulton County School’s Technology Plan. See APPENDIX to DESIGN REQUIREMENTS – Data Cabling System.

2. Voice Communications Cabling System: FCS will provide the telephone switch and individual phones for each required location. Construction contract shall provide telephone cabling and equipment. See APPENDIX to DESIGN REQUIREMENTS – Telephone Cabling System.

SECTION 27 4133 MASTER TELEVISION SYSTEMS

Contact FCS for current specification information.

SECTION 27 5116 PUBLIC ADDRESS SYSTEMS

1. Proprietary Product: Proprietary Product and Installation of Public Address Systems: Rauland Equipment with specifically approved accessories designed as a complete system furnished, and installed by Richardson Associates.

2. Sound systems shall be incorporated into the scope of work for all new school projects.

3. Provide public address systems at the following locations:
   3.1. Cafeterias (ES, MS and HS)
   3.2. Gymnasiums (ES, MS and HS)
   3.3. Auditoriums (HS)
   3.4. Drama Labs (HS)
   3.5. Football Stadiums (HS)

4. Architects shall be responsible for employing qualified professionals to design and develop construction documents for public address systems.

5. Design of public address systems shall be appropriate for the acoustical conditions and volume of each space.

6. Drawings and Specifications shall be submitted to FCS Facilities Services Department; the Supervisor of Interscholastic Athletic Programs, and to the Coordinators of Health and PE; Music and Drama for review and approval.

7. Features and functions shall include:
   7.1. Solid state in-wall type amplifier
   7.2. Built-in speakers
   7.3. Microphones designed especially for music pickup, recording and excellent speech reproduction
   7.4. Remote microphone outlets appropriate for the type of space
   7.5. Auxiliary input for future program sources
   7.6. Input for school wide intercom program and system announcements
   7.7. Fire alarm override if required

SECTION 27 5123 INTERCOM AND DOORBELL SYSTEMS

1. Proprietary Product: Proprietary Product and Installation of central Control Center: Rauland Telecenter ICS System, furnished and installed by Richardson Associates. Intercom system will include a master clock to control bells.

2. Provide intercom call-back system with master station in administrative office and call stations in each normally occupied space. Design professional to submit detailed catalog information to FCS for approval.
3. See Proprietary Specifications section in the Appendix of this document and contact propriety vender, Richardson Associates, for revisions.

4. Delivery Door Bell: Provide a door bell system at the exterior delivery door(s) to alert kitchen and/or custodial staff when deliveries have arrived. The appropriate location for the bell will be a function of the service area layout. Architect/engineer shall propose and obtain approval for the bell location(s).
SECTION 28 1005 ELECTRONIC ACCESS CONTROL UPGRADES

1. Summary: Work of this section calls for the GC to provide an upgrade to the Aiphone® JKW-1MD System to an IP based system utilizing the Aiphone® JKW-IP Video Intercom Adaptor for use with Aiphone “JK Series” hands-free color video system. The JKW-IP adaptor is an addition to a single door, single master JK boxed set. The system allows for call-in to the PC via the JKW-IP software, two-way audio and one way video communication between the door station and the PC, as well as the ability to activate a door or gate release mechanism.

2. Scope: GC shall provide The Aiphone® JK-1MD is the Master Monitor, Sub Master Station for the JK series Pan-Tilt and Zoom video entry security system and the Aiphone® Intercom Adapter; provide and connect a single 20’-0” Ethernet connector cable to the Adapter; provide and load software onto one PC; deliver site-specific as-built drawings with device placement and cable routing; applicable warranty as outlined in the original contract; and End-User Training to demonstrate basic operations of the systems.

2.1. Door Station - The Aiphone® JK-DV is a vandal resistant, flush mount, wide angle, digital pan-tilt and zoom color video door station. It is used with the JK hands-free, color video entry series. The JK-DVF faceplate is aluminum die cast, the call button is metal and the camera is protected with a clear Lexan lens cover.

2.2. Ethernet Cable: GC is responsible for concealing the cable in conduit in the slab, walls and or plenum.

2.3. Aiphone® JKW-IP Adapter: GC is responsible for placing the equipment in accordance with manufacturer specifications and in the pre-approved location identified by FCS.

2.4. PC Workstation: GC is NOT responsible for the PC Workstation. The Department of Technology will provide the required hardware, software and operating system to ensure full compatibility and functionality. The PC shall be positioned in the proper location with direct accessibility to a communication outlet at the time designated for the installation of the JKW-IP Adapter and Software.

2.5. Communication Outlet: The GC is NOT responsible for the Communication Outlet. If an outlet is not available or accessible within 20’, KPSS must notify FCS, make notation on the closeout document; and set-up the system in a temporary location in order to demonstrate connectivity and functionality.

2.6. Software: The GC is responsible for providing and loading software to one PC. The FCS Department of Technology will confirm that the equipment meets the required specifications; coordinate acquisition of the IP Address and identify available Ports; and provide assist to test and integrate the system to the network.

2.7. Integration and Connectivity: The GC must provide a master schedule for roll-out of the systems to schools that have not received the JK-1MD and identify the schools that will require de-installation and replacement of equipment. FCS shall provide guidelines for final connectivity to ports and closet equipment. The following additional requirements should be addressed by KPSS:

   2.7.1. Checklist of items that must be confirmed by FCS prior to installation
   2.7.2. Identify any school that will require Site Survey

3. Hardware:

   3.1. Aiphone® JK-1MD   Audio/Video Master Station   1
   3.2. Aiphone® JK-1HD   Audio/Video Master Station   1
   3.3. Aiphone® JK-1MD   Audio/Video Sub Master Station   1
   3.4. PS-1820UL  18VDC, 2Amp Power Supply   1
   3.5. MCW-SA  Desk Stand   2
   3.6. Aiphone® JK-DV  Surface Mounted Door Station   1

4. Training Scope: In addition to the requirements for training in the Original Scope, GC shall provide instruction and training for End-User personnel at each school as required for operation of the IP video Intercom Adaptors.

   4.1. Answering call from the door station
   4.2. Perform Door release activation
4.3. Manage zoom/wide, pan and tilt functionality
4.4. Adjust images
4.5. Room-to-room Communication with a master monitor station
4.6. Entrance monitoring
4.7. Sensor detection from connected equipment
4.8. Option output from IP video intercom adaptor
4.9. Balloon notification
4.10. Recording
   4.10.1. Recording and playback
   4.10.2. Automatic image recording
   4.10.3. Automatic video recording
   4.10.4. Manual image recording
   4.10.5. Manual video recording

5. Equipment – Technical Training: GC shall provide technical training for the JKW-IP Adapter.

6. Owner-Furnished Equipment: Within this scope the FCS Department of Technology assumes responsibility and provisioning for network equipment and infrastructure to include:
   6.1. PC Workstation
   6.2. Communication outlet
   6.3. Electronic closet equipment with an available port
   6.4. Ethernet communication outlet within 20’ of the APhone® Adapter
   6.5. An available workstation that complies with this specification

7. Contractor Responsibilities:
   7.1. Provide the APhone® intercom adapter and all materials and equipment specified herein
   7.2. Provide and connect a single 20’ Ethernet connector cable to the adapter
   7.3. Provide and load software onto one PC
   7.4. Deliver site-specific as-built drawings with device placement and cable routing
   7.5. Provide applicable warranty
   7.6. Provide End-User Training to demonstrate basic operations of the systems

SECTION 28 1600 INTRUSION DETECTION SYSTEMS

Intrusion detection system shall be included in the building contract for new schools and as required in renovation projects.

1. Coordination between the separate contractors will be required to maintain occupancy schedules.

2. A/E for security surveillance system shall coordinate design of security camera system with FCS Director of Safety/Security and the Intrusion Detection system with the Coordinator of Maintenance Services.

3. The Intrusion Detection System will consist of an UL Listed alarm control panel, control keypad, motion detectors, field device power supplies and all associated cable. The control panel shall include communication devices to allow transmission of alarm signals to UL Listed Central Station.

4. The Intrusion Detection System shall serve as the digital dialer for the building’s Fire Alarm System (provided by others). Two voice grade copper phones are required by code for this application.

5. The Intrusion Detection alarm control panel shall be interfaced with the Building’s Energy Management System such that the Intrusion Detection System status is provided and monitored by the Building’s Energy Management System. Intrusion Detection System status: ARMED, DIS-ARMED and ALARM ACTIVATION shall be monitored by the Building’s Energy Management System.

6. FCS has standardized on the Honeywell VISTA V128FBP Burglar/Fire Alarm Control Panel. It is the only approved alarm control panel for Fulton County School projects. The Alarm Control Panel shall be provided with the following:
   6.1. “RED” wall mounted, metal enclosure with hinged, lockable door
6.2. The alarm control panel shall be equipped with a 5140 DLM dual phone line communication kit and onboard digital dialer.

6.3. The alarm control panel shall provide 8 hard-wired zones and be expandable to 128 unique inputs. A combination of hardwired, looped and wireless may be utilized. All wireless transponders must have constant supervision (constantly polled for communication failure and battery status).

6.4. The alarm control panel shall be powered by a dedicated 120 VAC/20 amp emergency power circuit.

6.5. Local sounders or sirens, surge protection, battery back-up for the panel and all field devices as well as non-volatile memory for retaining of programming in the event of catastrophic power failure.

6.6. Alarm control panel shall allow for the programming of unique User codes for arming and disarming. Each User shall be provided with a unique code that is transmitted and saved (for report purposes) by the Central Station.

6.7. A minimum of two alarm control keypads, Model #6160 CR2 (“RED” and wall mounted) located as specified by FCS.

7. Dual technology motion detectors shall be provided to monitor corridors with entrances/exits on grade level, all classrooms with windows at grade level, all stairwell exit vestibules, front lobby/main entrances, Cafeterias with windows at grade level and Gymnasiums (with emergency exit doors on grade level and Loading Dock corridors.

7.1. In corridors, stairwell vestibules, front lobby/main entrances, cafeterias, gymnasiums and loading dock corridors, the Honeywell DT-907 long range and Honeywell DT-7435 short range detectors shall be deployed.

7.2. In classrooms, the GE Security AP669 ceiling mounted, 360 degree motion detector shall be deployed.

7.3. All field devices shall be powered by strategically located field device power supplies, Altronix Model # SMP3 with battery back-up.

8. A 100% device by device test must be conducted by the vendor under the supervision of an FCS representative prior to acceptance of the system. Letter of Acceptance will be issued by the FCS representative after all punch list items have been completed.

9. Warranty response times shall be as follows:

9.1. Response for repair/replacement of field device not functioning properly – 72 hours or less from notification

9.2. Response for repair/replacement of system or panel failure – 4 hours or less from notification to include nights, weekends and holidays

SECTION 28 3111 FIRE ALARM SYSTEM

Provide fully addressable digital fire alarm system complying with NFPA requirements. Provide separate intercom system – providing two-way communication.

1. Fire alarm systems shall be addressable alarm systems as manufactured by G.E. Edwards, Notifier, or FCI. (No exceptions).

2. No proprietary tools or equipment shall be required to service the installed system.

3. A complete log of all device addresses and devices shall be provided as part of the close-out documentation.

4. Demonstrate accuracy of log and device locations to FCS Facilities staff as part of building turn-over process.

5. Maintain service access to all devices.

6. Fire Alarm cabling shall be plenum rated with red tint.

7. Provide surge protection on all cabling upon entry and exits to building.
DIVISION 31 EARTHWORK

Information included in this section shall be used by the design professional to prepare the civil-site design for the specified project. Deviation from these requirements must receive written approval from FCS. Notwithstanding this, FCS is open to and encourages suggestions for the use of alternative methods or materials that may prove more efficient and/or cost effective.

The design professional is expected to meet with FCS Capital Improvement Program staff at the onset of each project to review project specifics and FCS expectations.

The design professional is expected to consult with the FCS Project Geotechnical Engineering Consultant throughout the design phase and/or incorporate information contained in the Geotechnical Report (if applicable) into the plans and specifications.

SECTION 31 1000 CLEARING

1. Demolition:
   1.1. Selective and mass demolition shall be coordinated with FCS. Include language within plans and specifications that provide FCS with the right to salvage any materials on site.
   1.2. Any items that are abandoned (i.e., storm lines, utility lines, utility poles, etc.) shall be reviewed with FCS and the site design professional shall coordinate the necessary removal. FCS's preference is for abandoned items to be removed, however exceptions may apply.

2. Clearing:
   2.1. Require contractor to clear all areas to be graded of debris and extraneous materials.
   2.2. Clearing consists of the removal from the general construction areas and proper disposal of all trees, brush, stumps, logs, grass, weeds, roots, decayed vegetable matter, refuse dumps, and all other objectionable matter resting on the original ground surface or appearing or being placed on these areas at any time before final acceptance of the work, except as provided for elsewhere.
   2.3. Clearing also includes the removal and proper disposal of any obstructions not to be salvaged, such as fences and poles, and incidental structures within the construction area which might interfere with construction.
   2.4. No burial shall be allowed on site.

3. Grubbing:
   3.1. Grubbing shall include the removal and proper disposal of all stumps, roots, and other vegetation or perishable matter that exists below the original ground surface. All sound, unsound or decayed stumps shall be removed to a depth of 2' below the original ground.

SECTION 31 2200 EARTHWORK/GRADING

1. Site Design:
   1.1. The design professional shall develop a site grading plan for the facility which provides for a balanced site (if possible).
   1.2. In the event that a balanced site is not possible, the design professional shall clearly indicate within the plans and specifications that the contractor is responsible for meeting the grades indicated, and that any haul off or haul in shall be at the contractor’s expense.
   1.2.1. If the site does not balance and there is excess cut material, FCS’s preference is for excess material to be spread on site as directed by the design professional and FCS representative (coordinate who this is with FCS). Excess material that cannot be spread on site shall be hauled off site. Plans and specifications shall stipulate that hauling and disposal of excess cut material shall be performed at no additional cost to the owner.
   1.2.2. Satisfactory Soil Materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SW and SP or as identified in the site specific Geotechnical report.
1.2.3. Unsatisfactory Soil Materials are defined as those complying with ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT or as identified in the site specific Geotechnical report.

2. Grading:
   2.1. Plans and specifications shall require the contractor to provide moisture control as indicated in the site specific Geotechnical Report.

3. Earth Excavation:
   3.1. Clearly indicate in specifications that earth excavation shall consist of all material found below the surface of the ground except active utilities and rock.

4. Rock Excavation:
   4.1. Clearly define within the specifications what shall be considered as rock (both mass and trench rock). Coordinate this with the site specific Geotechnical Report.
   4.2. Clearly define within the specifications how payment for rock removal shall be handled.
   4.3. Clearly define within the specifications what happens with rock that is removed. Coordinate this with FCS.
   4.4. Define rock limit payment lines.

5. Controlled Structural Fill:
   5.1. Clearly define within the specifications the soil classifications that will be considered as appropriate structural fill. Coordinate this with the site specific Geotechnical Report.

6. General Area Fill:
   6.1. Clearly define within the specifications the soil classifications that will be considered as appropriate general area fill. Coordinate this with the site specific Geotechnical Report.

7. Testing of Fill:
   7.1. Identify the type and frequency of testing that shall be provided.
   7.2. Provide a recommendation to FCS as to the level of service that is required by the geotechnical testing agency so that FCS can secure the appropriate services.
DIVISION 32 EXTERIOR IMPROVEMENTS

Information included in this section shall be used by the design professional to prepare the civil-site design for the specified project. Deviation from these requirements must receive written approval from FCS. Notwithstanding this, FCS is open to and encourages suggestions for the use of alternative methods or materials that may prove more efficient and/or cost effective.

The design professional is expected to meet with FCS Capital Improvement Program staff at the onset of each project to review project specifics and FCS expectations.

SECTION 32 0100 OPERATION AND MAINTENANCE OF EXTERIOR IMPROVEMENTS

1. Site Design:
   1.1. The design professional shall develop a master plan for the facility which provides for the programmed needs defined by FCS including considerations for future expansion to the core capacity. Coordinate with FCS the possibility of future building additions and account for this expansion in the stormwater management design.
      1.1.1. For new facilities and major renovations, design professional should account for 1 additional acre of future development in the stormwater management design.
      1.1.2. For small additions and renovations, coordinate the amount of future development with FCS.
   1.2. In addition, classroom areas should be configured so as to allow for expansion with a minimum amount of alteration of the original structure or site.

2. Future Portable Classrooms: Site design shall include pre-planned level areas for the future location of portable classroom units. Design of the stormwater management system shall account for the following number of portable classrooms.
   2.1. Elementary: 6 portable duplex classroom units (12 classrooms)
   2.2. Middle: 6 portable duplex classroom units (12 classrooms)
   2.3. High: 12 portable duplex classroom units (24 classrooms)
   2.4. Portable areas shall be adjacent to classroom wings if site constraints and conditions permit. Coordinate portable location with future building expansion areas to avoid relocation of portables when the building is expanded.
   2.5. Each portable is 1,750 sf in area, 28’ wide and 64’ long (double wide portable).
   2.6. Portables are built to a Type V-B construction classification and are designed and approved for educational occupancy.
   2.7. Portables should be located as close to the school building as permitted by code. The design professional shall verify separation requirements with the permitting authority and with FCS Facility Services Department during the preliminary design phase of each school.
   2.8. Portables are typically located a minimum of 17’ apart (face to face) to accommodate required stairs, ramps and sidewalks.
   2.9. Portables should be located so that access for removal can occur without the need to drive across play fields, landscape areas, irrigation systems, etc.
   2.10. Building service utilities (electrical, gas, water) shall not be located under the footprint of future portable locations.
   2.11. Avoid locating site drainage lines and inlet structures under and within portable building sites.
   2.12. A fire hydrant must be located within 400’ of all portable classroom building sites.
   2.13. Area that is designated for portables shall be improved to support 2,000 PSF minimum.
   2.14. Design of the site shall identify an area(s) for placement of portable classroom units without impacting parking, play fields and other required amenities.
   2.15. Provide a dedicated electrical supply (150 amp per classroom) in the nearest electrical panel for the first 8 classrooms. Refer to Division 26–Electrical for additional information.

3. Site Vehicular Circulation:
   3.1. Site shall be designed with 2 vehicular entrances in and out, preferably from two separate streets.
3.2. Site traffic circulation shall be designed with separate car and bus traffic routes that should not conflict.
3.3. Provide direct access to service area from bus loop or other main site circulation driveway.
3.4. Layout shall not require driving service vehicles through parking lots to access the service areas.
3.5. Provide walkway access from adjacent streets, parking, bus loading and sports facilities.
3.6. Walkways at high traffic areas shall be sized and located to avoid trampling of adjacent lawns and landscaping especially at building entrances and at heavily traveled routes to play areas. Coordinate locations and sizes of walks with FCS.
3.7. Provide gates or bollards to restrict vehicular access onto entrance and other major walkways.
3.8. Review specific requirements for traffic gates with FCS. Consider gates at drives leading to athletic areas, bus parking, marching band practice areas and entrances.
3.9. Design professional shall prepare an AutoTurn (or equivalent) simulation for the vehicular circulation within the site. Simulation shall be shared with FCS.

4. Automobile Parking and Student Drop-off/Pick-up:
4.1. Site plan shall provide auto parking:
   4.1.1. ES = Approximately three parking spaces per instructional unit, plus handicapped-accessible spaces per code.
   4.1.2. MS = Approximately three parking spaces per instructional unit, plus handicapped-accessible spaces per code.
   4.1.3. HS = Approximately 6.6 parking spaces per instructional unit, plus handicapped-accessible spaces per code. (Where space permits, provide an area without intermediate curbs within the paved parking area for marching band practice approximately the size of a football field.
4.2. Provide a designated separate auto drive and drop-off/pick-up area with appropriate stacking space for waiting cars.
4.3. Consider using speed humps at auto drives to reduce speeding. Review location of proposed speed humps which may impact bus traffic with FCS Executive Director of Transportation.
4.4. Provide separate parking lots for students and staff at high schools. Designer to coordinate the need for reserved parking with school administration. Reserved parking is part of the overall parking need as established in Section 4.1.

5. School Bus parking, drives and Loading/Unloading Areas:
5.1. Provide separate covered main bus and covered handicapped-accessible special education bus loading-unloading areas adjacent to school buildings.
5.2. Access to and from special education bus area shall be approximately level without extensive ramps or lifts.
5.3. Provide curbside bus loading-unloading adjacent to high school stadiums with appropriate turning radius and grades.
5.4. Paint auto parking overlay at bus staging area for additional activity parking.
5.5. Bus parking and driveway layout, including turn radius and grades for bus drives shall be reviewed and approved by FCS Executive Director of Transportation.

6. Loading Docks:
6.1. Provide standard height raised loading dock at high schools adjacent to kitchen and general storage/receiving area.
6.2. Provide 6” curb at elementary and middle school loading areas adjacent to kitchen and general storage/receiving area with 36” curb cut and ramp to grade.
6.3. See Division 27–COMMUNICATIONS for delivery doorbell requirements at receiving areas.

7. Dumpster Pads:
7.1. Concrete pads for dumpsters shall be provided as follows:
   7.1.1. ES - Two (1 garbage and 1 for recycling)
   7.1.2. MS - Three (2 garbage and 1 recycling)
   7.1.3. HS - Three but they can be left by the loading dock. (2 garbage and 1 recycling)
Division 32 Exterior Improvements

7.2. Provide heavy duty reinforced (steel or fiber) concrete paving at the dumpster pad area to resist wear from garbage truck turning their wheels to maneuver for dumpster pick up. The extents of the heavy duty reinforced concrete paving shall be coordinated with FCS.

7.3. Dumpster area shall be visually shielded.

7.4. Dumpster area shall to be easily accessible by sidewalk so that custodial carts can be used to transport trash to the dumpster.

7.5. Dumpster pad(s) shall be tied to the sanitary sewer system per local issuing authority codes. Dumpster pad shall be raised to prevent stormwater runoff from areas other than the dumpster pad surface to drain to dumpster pad drain.

7.6. The top of the dumpster shall be accessible. The dumpster location shall be adjacent to a loading area or dock so that trash can be thrown into the top of the dumpster. Where the dumpster is not adjacent to a loading dock, a ramp to the back or sides of the dumpsters shall to be provided.

7.7. FCS intends to pursue using compactors in the future. New school designs shall identify an appropriate location for a future compactor.

7.8. Review space required for dumpsters and future compactor with FCS Facilities Services Department.

8. Site Signage:
8.1. Site signage shall be evaluated and coordinated with FCS on a case by case basis.

SECTION 32 1000 PAVING AND SURFACING

1. Asphalt paving shall be used in all parking and driveway areas.

2. All asphalt paving for elementary and middle schools shall be heavy-duty.

3. For high schools, all asphalt travel lanes (including lane through parking lots) shall be heavy-duty. The parking stalls should be medium-duty.

4. Concrete paving with steel reinforcing shall be used at truck loading areas and dumpster pads. Coordinate paving section with site specific geotechnical report.

5. Sidewalks and plazas shall be steel or fiber reinforced concrete.

6. Elementary school play courts shall be concrete. Provide black vinyl coated chain link around play court if court is not used for fire truck turn around. Coordinate location and height of fencing with FCS.

7. Middle school play courts (tennis and basketball) can be asphalt or concrete. Design professional shall coordinate play court paving with FCS. Provide black vinyl coated chain link around play court if court is not used for fire truck turn around. Coordinate location and height of fencing with FCS.

8. Asphalt and GAB thicknesses shall be standardized and so illustrated in paving cross-sections. Coordinate paving section with site specific Geotechnical Report.

8.1. Heavy Duty Asphalt: 8” G.A.B., 3” binder, 2” top course.

8.2. Medium Duty Asphalt: 6” G.A.B., 3” binder, 2” top course.

9. Final asphalt topping course shall be in place before bus run through.

10. Plans and specifications shall require a 15 year warranty on all asphalt paving.

11. Provide direct access to service area from bus loop or other main site circulation driveway.

12. Driving service vehicles through parking lots to access the service area should be avoided.

13. Asphalt striping shall be white. Thermoplastic painting should only be identified if required within the R.O.W.

14. Plans and specifications shall delineate that fire curbs be painted red.
SECTION 32 1800 ATHLETIC AND RECREATIONAL SURFACING

1. High School Stadium Track and Field: high school track and field shall have layouts in accordance with competition standards of the Georgia High School Association and the National Federation of State High School Associations. Each field shall include the following:
   1.1. Orientation with long dimension north and south
   1.2. Provide areas for field events including paved areas for high jump and long jump with sand pit.
   1.3. Synthetic turf playing field
   1.4. Polyurethane surfacing system running track (8 Lanes)
   1.5. Paved areas for high jump and long jump with sand pit
   1.6. See Division 11–EQUIPMENT for Athletic Equipment
   1.7. Field Lighting - See Division 26–ELECTRICAL for Sports Field Lighting

2. Synthetic Turf System:
   2.1. All high school stadiums will have a synthetic turf system.
   2.2. Base system will include single letter logo at midfield; school name in one end zone and mascot name in the other; single letter color; and striping and markings for football (white), soccer (yellow) – reference marks only the six yard end boxes, men’s and women’s lacrosse (red) – reference marks only. The basis of design for the rubber infill system is similar to Sprint Turf or Shaw Sports Turf.

3. High School Track and Field Surfacing:
   3.1. High school tracks shall be a polyurethane surfacing with a basis of design system similar to Beynon Sports Surfaces, BSS-300. The elastomeric polyurethane shall be red in color with line striping and event markings in accordance with current National Federation of State High School Associations standards and guidelines. Provide 8 track lanes where space permits.

4. Middle School Track and Field: Middle school track and field areas shall be constructed to appropriate grading and grassing standards but are not required to meet competition standards of the Georgia High School Association and the national Federation of State High School Associations. Each track and field shall include the following:
   4.1. Irrigated grass field inside running track
   4.2. Slope field to storm drains within field
   4.3. Asphalt running track with painted lanes
   4.4. 400 meter track with 6 lanes where space permits
   4.5. 300 meter track with 5 lanes where space is limited
   4.6. Paved ADA access from building
   4.7. Paved areas for high jump and long jump with sand pit
   4.7.1. See Division 11 EQUIPMENT for Athletic Equipment

5. High School Baseball Field: High school baseball field shall have layout in accordance with competition standards of the Georgia High School Association and the national Federation of State High School Associations. Field shall include the following:
   5.1. Orientation with home plate at southwest and second base at northeast
   5.2. Field size: 330’ long at R/L foul lines x 380’ deep at center of outfield
   5.3. Outfield and Diamond of natural grass turf with irrigation system
   5.4. Warning track around the entire field
   5.5. Infield playing surface with appropriate infield mix
   5.6. Pitching mound raised 10’ with pitching rubber
   5.7. Fencing 10’ high with windscreen (with proper wind rated ties and air flaps). Specify top, center and bottom pipe rails.
   5.8. Backstop located 60’ behind home plate, height as required for safety
   5.9. Two concrete block dugouts
   5.10. Two bullpens (One at each side, inside fence)
   5.11. One batting cage with 110V electrical outlets for pitching machine (Outside fence)
   5.12. Weather-proof water spigot within ground box behind pitcher’s mound
   5.13. 110-volt electrical duplex outlet within weather proof in ground box behind pitcher’s mound
5.14. Scoreboard located between center and left field  
   5.14.1. See Division–11 EQUIPMENT for Scoreboard

5.15. Two sets of bleachers 5 rows high x 10' deep x 21' long anchored to concrete pads:  
   5.15.1. See Division–13 SPECIAL CONSTRUCTION for Portable Bleachers

5.16. Field Lighting  
   5.16.1. See Division–26 ELECTRICAL for Sports Field Lighting

5.17. Shared Baseball/Softball Concession/Restrooms/Storage  
   5.17.1. See Division–11 EQUIPMENT for Concession Equipment

6. High School Softball Field: High School softball field shall have layout in accordance with competition standards of the Georgia High School Association and the national Federation of State High School Associations. Field shall include the following:
   6.1. Orientation with home plate at southwest and second base at northeast
   6.2. Field size: 200' long at R/L foul lines x 200' deep at center of outfield
   6.3. Outfield of natural grass turf with irrigation system
   6.4. Warning track
   6.5. Infield playing surface with appropriate infield mix
   6.6. Pitching mound level with infield with pitching rubber
   6.7. Fencing 10' high with windscreen (with proper wind rated ties). Specify top, center and bottom pipe rails.
   6.8. Backstop located 25' behind home plate, height as required for safety
   6.9. Double first base
   6.10. Two concrete block dugouts
   6.11. Two bullpens (One at each side, inside fence)
   6.12. One batting cage with 110V electrical outlets for pitching machine (Outside fence)
   6.13. Water spigot within weather proof in ground box behind pitcher’s mound.
   6.14. 110-volt electrical duplex outlet within weather proof in ground box behind pitcher’s mound.
   6.15. Scoreboard located between center and left field  
       6.15.1. See Division–11 EQUIPMENT for Scoreboard
   6.16. Two sets of bleachers 5 rows high x 10' deep x 21' long anchored to concrete pads:  
       6.16.1. See Division–13 SPECIAL CONSTRUCTION for Portable Bleachers
   6.17. Field Lighting:  
       6.17.1. See Division–26 ELECTRICAL for Sports Field Lighting
   6.18. Shared Baseball/Softball Concession/Restrooms/Storage:  
       6.18.1. See Division–11 EQUIPMENT for Concession Equipment

7. Middle School Softball Field: Middle school softball field shall be constructed to appropriate grading and grassing standards but are not required to meet competition standards of the Georgia High School Association and the national Federation of State High School Associations. Field shall include the following:
   7.1. Orientation with home plate at south-southwest and second base at north-northeast
   7.2. Field size: 200' long at R/L foul lines x 200' deep at center of outfield
   7.3. Grass infield and outfield with irrigation system
   7.4. Appropriate drainage towards outfield
   7.5. Skinned earth between bases
   7.6. Pitching mound level with infield
   7.7. Fencing 8’ tall with windscreen (with proper wind rated ties). Specify top and bottom pipe rails.
   7.8. Backstop located 25’ behind home plate, 20' high

8. High School Practice Field: High school practice field is intended for instruction and use for multiple sports. It shall be constructed to appropriate grading and grassing standards but are not required to meet competition standards of the Georgia High School Association and the national Federation of State High School Associations. Practice field shall include the following:
8.1. Orientation with long dimension north and south
8.2. 78 yards wide x 120 yards long
8.3. Grass turf with irrigation system
8.4. Provide netting where necessary to prevent damage from balls entering adjacent areas.
8.5. Fixed football goalpost and movable soccer goals
   8.5.1. See Division 11–EQUIPMENT for goalpost and goals.

9. ELEMENTARY School Multi-Purpose Field: Elementary school multi-purpose field is intended for informal outdoor activities and elementary level sports. It shall be constructed to appropriate grading and grassing standards. The multi-purpose field shall include the following:
   9.1. Approximately 2 acres adjacent to the gym if site configuration will allow
   9.2. Well drained natural turf without irrigation system

10. Tennis Courts: Provide four tennis courts at each middle school and five at each high school. Tennis courts shall have layouts in accordance with competition standards of the Georgia High School Association and the national Federation of State High School Associations.
   10.1. Regulation size
   10.2. Contrasting light blue and medium green surface between court and remaining play area
   10.3. Orientation with baselines of courts perpendicular to north-south axis
   10.4. Fencing 10’ high with windscreen (with proper wind rated ties and air flaps). Specify top, center and bottom pipe rails. Fencing shall be 20' from baseline, 12' from sidelines.
   10.5. Omit windscreens screens at bleachers.
   10.6. 110v duplex electrical outlet at each end of the bank of courts
   10.7. At high schools, provide one set of 5 row bleachers anchored to a concrete pad at west end of courts
   10.7.1. See Division 13–SPECIAL CONSTRUCTION for Portable Bleachers

SECTION 32 3100  FENCES AND GATES

1. Unless otherwise specifically approved by FCS, all permanent fences and gates shall be black vinyl coated chain link construction.

2. Typical fencing shall be 9-gauge core wire and 6-gauge finish thickness. Fencing mesh size shall be 2”. Tennis court fencing mesh size shall be 1 ¾”. Provide appropriate black vinyl coated post and gates, installed in accordance with Chain Link Fabrication Manufacturers Association criteria. Provide pipe top rail for all fencing.

3. Fence fabric shall have knuckled selvages at top and bottom of fabric.

4. Fence Posts shall be:
   4.1. Line Posts – 2-3/8” nominal O.D. for fences 4’ and 6’ in height
   4.2. Line Posts – 2-7/8” nominal O.D. for fences 8’ and 10’ in height
   4.3. End, Corner, and Pull Posts – 2-7/8” nominal O.D. for fences 4’ and 6’ in height
   4.4. End, Corner, and Pull Posts – 4” nominal O.D. for fences 8’ and 10’ in height
   4.5. Swing gate post in accordance with ASTM F 900

5. Line post spacing shall be as follows:
   5.1. For fence heights of 4’, 6’, and 8’, line posts shall be installed uniformly at 10’ o.c.
   5.2. For fence heights of 10’ line posts shall be installed uniformly at 8’ o.c.

6. Footing diameters shall be as follows:
   6.1. Fence post diameters up to 3” footing diameter shall be 12”
   6.2. Fence post diameters up to 4” footing diameter shall be 16”
   6.3. For fence heights over 10’ footing diameter shall be a minimum of four times greater than O.D. of post

7. Footing Depths shall be as follows:
   7.1. Fence heights of four (4) and six (6) feet footing depth shall be 36”.
   7.2. Fence heights of eight (8) and ten (10) feet footing depth shall be 42”.

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7.3. Other fence heights; depth of footing depth shall be 24” plus an additional three (3) inches for each one (1) foot increase in the fence height over four (4) feet.

8. Fence posts shall be set 3” above bottom of footing excavation.

9. General site fencing shall be 6’-0” high with appropriately located gates. Storm detention/retention areas shall be fenced with the same material per local requirements.
   9.1. Plans shall identify access point for portables and shall allow for a 20’ opening (sleeve post or double post).

10. Gates shall be provided at vehicular entrances to limit access during certain time periods.
   10.1. Gate shall be pipe gates with hold opens (4” diameter Steel bollard with birdhead holds) and reflective stop signs.

11. Perimeter and other fencing shall be installed as needed to provide safety and security of the students, teachers and staff. Exact location of fencing will be determined on-site by FCS in order to preserve natural areas and undisturbed buffers.

12. Fencing and wind screens at sports fields shall be of the height and locations described in the relevant sections of these guidelines. Fences shall be black vinyl coated chain link construction of appropriate gauge and mesh for the height required with appropriate black vinyl coated post and gates, installed in accordance with Chain Link Fabrication Manufacturers Association criteria. Wind Screens shall be forest green.

**SECTION 32 3200 RETAINING WALLS**

1. Retaining walls under 10’ in height that do not support structural elements (buildings, drives, parking, etc.) can be identified as a “Design/Build” item for the contractor.
   1.1. Design professional shall provide performance specifications for the retaining wall system.

2. Retaining wall over 10’ or walls that support structural elements (buildings, drives, parking, etc.) shall be designed and detailed by the design professional or qualified sub-consultant.

3. Type of retaining wall system (Reinforced Concrete, Mechanically Stabilized Earth (MSE), Geosynthetically Confined Soil (GCS) Wall, etc.) shall be chosen by the design professional and approved by FCS.

4. Plans and specifications for all walls shall identify the amount (frequency) and type of testing that is required for construction of the wall. Coordinate said requirements with the owner’s geotechnical testing agency.
   4.1. Require that the owner’s geotechnical testing agency perform all required testing for the wall construction.

5. Unsuitable soils found below the footing elevation of the wall are the responsibility of FCS. Unsuitable soils found from the top of the wall footing to the top of the wall are the contractor’s responsibility.

6. Confirm that all applicable retaining wall permits are obtained.
   6.1. Contractor is responsible for obtaining wall permits for design-build walls.
   6.2. Design professional is responsible for obtaining wall permits for walls that they designed.

7. The wall designer of record shall be responsible to certify in writing that the wall was designed and constructed per the plans and specifications.

**SECTION 32 8000 LANDSCAPING IRRIGATION SYSTEM**

Commercial grade sprinkler irrigation system with automatic operation shall be provided for the grass playing and practice fields at middle and high schools only. Do not provide irrigation at elementary school play fields.

1. Design professional shall consult with FCS Facilities Services and obtain approval for proposed irrigation system prior to issuing final drawings.

2. Approved irrigation systems are Rain Bird, Toro and Hunter.
3. Include a drilled well in middle and high school specifications for irrigation purposes. The well needs to have a yield of greater than 100 gallons per minute or, if less, provide water storage facility to compensate for lesser yield.
   3.1. If a well is not feasible, design irrigation system to be supplied by public water system with separate irrigation meter.

4. Provide an irrigation controller equipped with wireless access.

5. No landscape planting irrigation is desired.

6. See Division 21—PLUMBING for Exterior Hose Bib requirements.

**SECTION 32 9200 TURF AND GRASSES**

All general areas to be grassed shall be sodded with Tifway 419 Bermuda.

1. Lawns and grass shall be watered and maintained for a period of no less than 60 days, prior to a request for inspection and acceptance by FCS and to the opening of the school year.

2. Lawns and grass shall be fully established prior to inspection.

3. Lawns and grass shall receive a minimum of 2 cuts prior to request for acceptance.

4. Lawn specifications
   4.1. Adequate seedbed preparation – 4” tilled topsoil or amended organic soil
   4.2. Rock hounding in two directions needs to be specified to pick up sticks/stones greater than 1/2” diameter.
   4.3. Areas to be planted with sod vs. seed need to be identified on the drawings. Usually all areas close to the building or inside a perimeter drive should be sod.
   4.4. All sod shall have the harvest netting removed prior to installation.

5. Plans and specifications shall require the contractor to provide FCS with a turf maintenance plan.

6. Design professional shall consult with FCS Facilities Services and obtain approval for proposed lawn specifications prior to issuing final drawings.

**SECTION 32 9300 PLANTS**

1. Design professional shall design planting plans in accordance to local jurisdiction overlay planting requirements.

2. In general, use low maintenance Xeriscape plantings.

3. Minimize grass/sod; look at alternatives; use most practical application for each area.

4. Do not use non-native invasive plantings.

5. Require contractor to gain the approval of the design professional and the FCS representative for the planting bed preparation prior to installing plants.

6. Use pine straw mulch in planting areas. Provide raised curb or other device to restrict washing of mulch onto adjacent paved walks and drives.

7. Keep tree plantings:
   7.1. A minimum of 20’ from perimeter of building
   7.2. A minimum of 15’ from sidewalks, curbs and paving
       7.2.1. Parking lot trees shall adhere to local overlay ordinances which may not meet the above criteria.

8. Low maintenance ground covers may be used in low-traffic areas and on slopes as appropriate. These plantings shall be maintained by the contractor for no less than 60 days, prior to a request for inspection and acceptance by FCS.
9. Pine straw mulch, 6" deep, shall be provided at all new tree and shrub plantings.

10. Comply with tree ordinances and provide additional buffers as may be directed by the municipality of jurisdiction. Review proposed new shrubs and trees with FCS Facilities Services Department.
DIVISION 33 UTILITIES

Information included in this section shall be used by the design professional to prepare the civil-site design for the specified project. Deviation from these requirements must receive written approval from FCS. Notwithstanding this, FCS is open to and encourages suggestions for the use of alternative methods or materials that may prove more efficient and/or cost effective.

The design professional is expected to meet with FCS Capital Improvement Program staff at the onset of each project to review project specifics and FCS expectations.

SECTION 33 1100 WATER UTILITY DISTRIBUTION PIPING

1. Domestic Piping Material:
   1.1. Domestic water service pipe installed underground 3" and less shall be Type "K" hard drawn copper tubing with wrought copper solder joint fittings conforming to ASTM B-88-72. Minimum depth of cover shall be 36".
   1.2. Domestic water pipe installed underground 4" and larger shall be cement lined ductile iron pipe conforming to ANSI A21.51. Minimum depth of cover shall be 36".
   1.3. Valves:
      1.3.1. Unless specifically indicated otherwise, the valves shall be designed for not less than 125 lbs working pressure. The valves shall be suitable for the service for which they are installed.
      1.3.2. Gate valves for copper water lines shall be Milwaukee Figure 115 bronze valve with non-rising stem (nut and valve key) and sweat ends or approved equal by Crane, Hammond, Mueller, Nibco, Stockham or Watts. Depth of valves shall be such that the valve is accessible with a standard valve key.
      1.3.3. Gate valves for ductile iron water lines shall be Watts model 406-NRS-RW flanged gate valve with non rising stem (nut and valve key) or approved equal by Crane, Hammond, Kitz, Milwaukee, Mueller, Nibco, or Stockham. Provide black vinyl coated chain link around play court if court is not used for fire truck turn around. Coordinate location and height of fencing with FCS.
      1.3.4. Double check valves shall be Watts No. 709-RW or 007-QT as indicated, epoxy coated double check valve with two gate valves and four test cocks. The valve assembly shall be U. L. listed. Approved equal valves by Ames, Febco, Hersey or Wilkins are acceptable.

2. Fire Protection Piping Material (Underground Piping):
   2.1. Underground Piping (Ductile Iron):
      2.1.1. Underground piping shall be cement lined ductile iron pipe manufactured in accordance with ANSI 21.51.
      2.2. Fittings and Couplings:
      2.2.1. Fitting for underground piping shall be ductile iron manufactured in accordance with ANSI A21-10. All ductile iron pipe fittings shall be in accordance with AWWA C151/ANSI A21.51.
      2.3. Valves:
      2.3.1. OS & Y valves, post indicator valves and check valves shall be listed by U. L. for use in fire mains. Gate valves: Iron-Body Bronze - Mounted Gate Valves, Sizes 3" - 12", inclusive: Order Specification: Double-Disc, Parallel Seats, Non-rising stem (IS), Rated at 200-psi WWP, O-ring seals, Std 2" square wrench nut, and conforming to AWWA Specifications C500 in all respects. Check with Water Department for direction of opening.
      2.4. Backflow Prevention Valves:
      2.4.1. Double check detector valve assembly shall be Watts 709 DCDA double check valve with detector CFM meter, two OS & Y gate valves and four test cocks.
      2.4.2. Valves shall have epoxy coated cast iron bodies. The valve assembly shall be U. L. listed.
      2.4.3. Valves shall be as manufactured by Watts or approved equal by Ames, Febco or Hersey.
2.5. Fire Hydrants:
2.5.1. Fire 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.

SECTION 33 3000 SANITARY SEWER UTILITIES

1. Plastic Pipe Systems:
   1.1. PVC Pipe:
       1.1.1. PVC pipe which is 6" through 15" in diameter shall conform to ASTM D3034 SDR35. Sizes 18" through 27" in diameter shall conform to ASTM F679 SDR35, polyvinyl chloride pipe (PVC).

1.2. Ductile Iron Pipe
   1.2.1. Ductile iron pipe shall be 8" diameter Class 50 pipe conforming to ANSI A21.51.

2. Structures:
   2.1. Pre-cast Concrete Units:
       2.1.1. Pre-cast concrete units shall conform to ASTM C478, and shall be circular with circular reinforcement. The wall thickness shall be five inches for stack depth sections up to 32 feet. Base slab shall be eight inches thick for depths up to 25 feet and 12 inches thick for depths greater than 25 feet.
       2.1.2. Pre-cast concrete manhole tee units shall conform to ASTM C76, Class IV, and shall be circular with circular reinforcement.

2.2. Manhole Frames and Covers:
   2.2.1. Manhole frames and covers shall conform to ASTM A48, Class 30, gray iron. The castings shall be neatly made and free from cracks, cold sheets, holes and other defects. Surfaces of casting shall be ground to assure proper fit and to prevent rocking. Manhole frames and covers shall comply with Fulton County Public Works criteria.

SECTION 33 4000 STORM DRAINAGE UTILITIES

1. Pipe Materials:
   1.1. The design professional shall determine the appropriate pipe material for each project. Pipe materials may be:
       1.1.1. Reinforced Concrete Pipe (RCP)
       1.1.2. Corrugated Metal Pipe (CMP) with paved invert
       1.1.3. Aluminized Steel Type 2 (AST2)
       1.1.4. Polyvinyl Chloride Pipe (PVC)
       1.1.5. High Density Polyethylene Pipe (HDPE)

2. Appurtenances Material:
   2.1. Castings: All castings shall be gray iron conforming to Georgia DOT Specifications.
   2.2. Other materials required to completely install storm sewers in accordance with these specifications shall conform to all applicable articles and paragraphs of Georgia DOT Specifications.
PROPRIETARY SPECIFICATIONS

It is the desire of Fulton County School System to utilize proprietary specifications for items in which there are less than three acceptable manufacturers or for items in which new purchases must be of the same manufacturer as existing to achieve system wide compatibility and economical use of funds in the maintenance of the systems.

- The FCSS will furnish a letter of justification for each project, which must be submitted with final documents to the GDOE.
- Proprietary products are more specifically referenced within individual sections below. The design professional shall verify that the latest and most current document is used in the contract document.

Sample Letter of Justification:

August 13, 2014

Michael D. Rowland
Georgia Department of Education, Facilities Services
205 Jess Hill Jr. Drive, SE
Suite 1670 Twin Towers East
Atlanta, GA 30334

Re: Derrick Road Elementary School
Fulton County Schools, Proprietary Specifications List

Dear Mr. Rowland

Attached please find the Fulton County School’s Proprietary Specifications list amended October 26, 2012 for the above referenced school. It is the desire of the Fulton County School System to utilize proprietary specifications for items in which there are less than three acceptable manufacturers or for items in which new purchases must be of the same manufacturer as existing to achieve system wide compatibility and economical use of fund in the maintenance of the systems.

Sincerely,

FULTON COUNTY SCHOOLS

Michael Wilborne,
Director of Capital Improvements

Attachment
Sample Proprietary Spec List:

AMENDED January 15, 2013


Fulton County School System
Derrick Road ES
Proprietary Specification Explanation (January 15, 2013)

STRUCTURE FIBER DECK AND WALL PANELS
03 5113  Structure Fiber Deck and Wall Panels

Explanation – Fiber cement panels were evaluated and included in the prototype elementary school design as an effective and economical finish for gymnasium ceilings/roofs that were abuse resistant and provided adequate acoustical dampening. This product has proven durable and extremely reliable and is currently in use at more than 15 elementary schools that have been built from this prototype. When first approved 10 years ago, several manufacturers provided fiber cement panels, at this time only Tectum Inc. is still producing these panels. Despite this lack of competition these panels are still cost effective.

DOOR HARDWARE
08 7100  Door Hardware
  Product – cylinders: Best Lock Company

Explanation – The use of Best Lock cylinders with a restricted keyway design is critical to the effective and efficient management of access control to our facilities through the use of a hierarchy of keying schemes.

  Product – Overhead Door Holders: Glynn Johnson, Rixson-Firemark

Explanation – The restriction of the use of these two brands was deemed necessary in order to provide reliable operation that is critical to our ability to comply with fire codes and maintain the ability to properly secure doors. Glynn Johnson and Rixson-Firemark have proven to be extremely reliable products and the restriction to these manufacturers allows us to cost effectively maintain in-house stocks of critical repair parts and associated competency in accomplishing repairs using in-house forces who are available on a 24/7 on-call basis.

  Products – Door Closers/Power Operators: LCN

Explanation – The restriction of the use of LCN brand door closers and power operators were deemed necessary in order to provide reliable operation that is critical to our ability to comply with fire codes and maintain the ability to properly secure doors. LCN equipment has proven to be extremely reliable and the restriction to this manufacturer allows us to cost effectively maintain in-house stocks of critical repair parts and associated competency in accomplishing repairs using in-house forces who are available on a 24/7 on-call basis.
Products – Panic Hardware/Exit Devices: Von Duprin

Explanation – The restriction of the use of Von Duprin brand panic hardware and exit devices were deemed necessary in order to provide reliable operation that is critical to our ability to comply with fire codes and maintain the ability to properly secure doors. Von Duprin equipment has proven to be extremely reliable and the restriction to this manufacturer allows us to cost effectively maintain in-house stocks of critical repair parts and associated competency in accomplishing repairs using in-house forces who are available on a 24/7 on-call basis.

PLAY EQUIPMENT
11 6813 Play Equipment
Product – Play Equipment: Miracle Recreation

Explanation – The restriction of the use of Miracle Recreation equipment allows FCS to provide equitable recreational equipment at all elementary schools sites that meet code requirements for safety and to standardize employee training regarding safety and maintenance. Miracle equipment has proven to be durable and the restriction to this manufacturer allows us to cost effectively maintain in-house stock of critical connection pieces and to easily identify and order replacement parts that are interchangeable from site to site. Miracle Recreation was selected through an RFP process that includes a yearly renewable contract for a period of five years.

ENERGY MANAGEMENT SYSTEM
23 0900 Automated Temperature Controls and Energy Management System (ATC and EMS) Product – Automated Logic System 20/20

Explanation – The decision to select one vendor, Automated Logic, to be the sole-source for the energy management system benefits Fulton County Schools in many ways. The benefits are due to reduced manpower, reduced costs, reduced training, and interoperability. The energy management and control system in a building is one of the most technically complex systems in a facility. The current focus on one vendor prevents Fulton County schools from paying the vendor to troubleshoot or repair the system. These costs would show up as a service contract or purchase order. The avoided operating budget costs are estimated at $220,000 per year based on the size of our school system. Adding additional vendors would require annual budget increases of roughly $5,000 per year per facility.

Manpower Savings
All 100+ facilities in Fulton County Schools are currently controlled by a single energy management system. Manpower savings occur due to the centralization of the building data including scheduling, alarms, and energy analysis. The man-hour savings are tough to quantify but represent a real benefit in the quest to do more with less. Budget cutbacks require our maintenance staff to cover more buildings than ever before.

Energy Savings
A good energy management system provides temperature control of the rooms and all mechanical equipment while using the least amount of energy. The expertise to troubleshoot and repair the system is currently in house with the existing staff. It requires a very intimate knowledge of how the control system works to identify that a control sequence is ineffective, wastes energy, or both. Additional benefits include a reduced parts inventory and reduced software upgrade fees.
DATA CABLING SYSTEMS
27 1500 Data Cable Systems
Product – Patch Panels: Siemon Company

Explanation – The Siemon product system has been found to be extremely reliable and rugged for use in varying locations. FCS cabling technicians are trained in the installation and maintenance of Siemon products. Use of this manufacturer on an exclusive basis helps reduce the quantity and cost of inventory necessary to support installation and emergency repairs. Using Siemon Company products exclusively on new projects provides FCS with an extended 20 year warranty on the complete data cabling installation and audit services if performance questions occur. Additionally, should the Siemon Certified installer fail to install the Siemon products correctly the Siemon Company will implement corrective action at no cost to FCS. Exclusive use of Siemon products provides a known standard of performance when reviewing network performance issues.

Product – Data Outlets: Siemon Company

Explanation – The Siemon product system has been found to be extremely reliable and rugged for use in varying locations. FCS cabling technicians are trained in the installation and maintenance of Siemon products. Use of this manufacturer on an exclusive basis helps reduce the quantity and cost of inventory necessary to support installation and emergency repairs. Using Siemon Company products exclusively on new projects provides FCS with an extended 20 year warranty on the complete data cabling installation and audit services if performance questions occur. Additionally, should the Siemon Certified installer fail to install the Siemon products correctly the Siemon Company will implement corrective action at no cost to FCS. Exclusive use of Siemon products provides a known standard of performance when reviewing network performance issues.

Products – Fiber Optic Cable Couplers and Connectors: Siemon Company

Explanation – The Siemon product system has been found to be extremely reliable and rugged for use in varying locations. FCS cabling technicians are trained in the installation and maintenance of Siemon products. Use of this manufacturer on an exclusive basis helps reduce the quantity and cost of inventory necessary to support installation and emergency repairs. Using Siemon Company products exclusively on new projects provides FCS with an extended 20 year warranty on the complete data cabling installation and audit services if performance questions occur. Additionally, should the Siemon Certified installer fail to install the Siemon products correctly the Siemon Company will implement corrective action at no cost to FCS. Exclusive use of Siemon products provides a known standard of performance when reviewing network performance issues.

INTERCOM and SOUND SYSTEMS
27 5123 Intercom and Program Systems
Products – Intercom and Program/Panic Annunciator Systems: Rauland-Borg Intercom Systems

Explanation – The restriction of the use of Rauland brand intercom and panic annunciator systems was deemed necessary in order to provide reliable operation that is critical to our ability effectively and efficiently maintain
reliable communication within schools for routine and emergency communication with school occupants. We have had unsatisfactory results with other manufacturers’ systems and the standardization has proven to be cost effective because it allows us to maintain in-house stocks of critical repair parts and associated competency in accomplishing repairs using in-house forces who are available on a 24/7 on-call basis.

SECURITY SURVEILLANCE SYSTEM

28 1000 Security Surveillance System

Product – Digital Video Recorder (DVR): GE Security

Explanation – The restriction of the use of GE Security Digital Video Recorder was deemed necessary in order to provide reliable operation that is compatible to the system wide software used by staff to monitor and record. GE Security DVRs have proven to be reliable and is the only DVR available that is compatible with the software used by FCS.
SECTION 08 7100  DOOR HARDWARE SAMPLE SPECIFICATION

PART 1 – GENERAL

1.1 SUMMARY
A. This Section includes items known commercially as finish or door hardware that are required for swinging, sliding and folding doors, except special types of unique hardware specified in the same Sections as the doors and door frames on which they are installed.

1.2 RELATED DOCUMENTS
A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. This Section Includes the following:
   1. Butts and Hinges
   2. Cylinders
   3. Locksets and Trim
   4. Exit Devices
   5. Door Closers
   6. Power Operators
   7. Door Stops
   8. Weatherstripping/Gasketing
   9. Thresholds
  10. Push Plates
  11. Door Bolts/Coordinators
  12. Overhead Door Stops and Holders
  13. Door Pulls and Pull Plates
  14. Push Pull Sets
  15. Protection Plates
  16. Silencers
  17. Key Cabinet and System
  18. Security Equipment
  19. Magnetic Hold-Open Devices
  20. Fasteners
C. Related Sections:
   1. Section 08 11 00: Steel Doors and Frames
   2. Section 08 12 50: Aluminum and Fiberglass Doors
   3. Section 08 14 00: Wood Doors
   4. Section 08 33 10: Coiling Counter Doors
   5. Section 08 33 20: Overhead Coiling Doors or Grilles
   6. Division 26: Electrical
   7. Division 28: Fire Alarm Systems
D. Items listed in other Sections and not included herein as “Door Hardware”
   1. Cabinet Hardware
   2. Bath Accessories
   3. Nameplates, Room Numbers, Exit Signs
   4. Handicapped Signs
   5. Hardware for Overhead and Roll-up Doors, except Cylinders
   6. Smoke Detectors, 120VAC Power, Wiring and Conduit
   7. Door Position Switches
   8. Acoustic Doors: Cam Lift Hinges, Astragals, Door Bottoms and Seals
   9. Gate Hardware, except locking devices
  10. Local Alarms and Annunciators

A-6
Updated February 27, 2015
1.3 SYSTEM DESCRIPTION

A. Design Requirements:
   1. Exit doors, including each leaf of a pair of doors, to be always operable from the inside by the simple turn of a lever or by pushing an exit device touchpad, without the use of a key or any special knowledge or effort. This includes doors serving toilet and storage rooms.
   2. The force applied to operate exit hardware is to require not more than 15 lbs. applied in the direction of travel.
   3. Refer to applicable headings in Part 3, Hardware Schedule for system description of electric and electro-pneumatic hardware products.

B. References:
   1. Standards of the following, as referenced:
      a. American National Standards Institute (ANSI)
      b. Door and Hardware Institute (DHI)
      c. Factory Mutual (FM)
      d. National Fire Protection Association (NFPA)
      e. Underwriters' Laboratories, Inc. (UL)
      f. UL 10C - Fire Tests Door Assemblies
      g. Warnock Hersey

C. Regulatory Requirements:
   1. IBC International Building Code, with Georgia Amendments.
   2. Fire Doors: Comply with requirements of UL - Fire Protection and Accident Hazard Equipment, NFPA 80 and IBC requirements for Positive Pressure testing.
   4. ICC/ANSI A117.1 Accessible and Usable Facilities.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Shop Drawings:
   1. Wiring Diagrams: Submit diagrams, templates, instructions and installation manuals for electrical and electronic hardware.

C. Product Data:
   1. Submit manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

D. Finish Hardware Schedule:
   1. Submit hardware schedule coordinated with doors, frames and related work to ensure proper size, thickness, hand, function and finish of door hardware.
   2. Schedule Content: Based on hardware indicated, organize schedule into vertical format "hardware sets" indicating complete designations of every item required for each door or opening. Use specification Heading numbers with any variations suffixed a, b, etc. Include the following information:
      a. Type, style, function, size and finish of each hardware item.
      b. Name and manufacturer of each item.
      c. Fastenings and other pertinent information.
      d. Location of each hardware set cross-referenced to indications on drawings, both on floor plans and in door and frame schedule.
      e. Explanation of all abbreviations, symbols and codes contained in schedule.
Door Hardware

Appendix

Fulton County Schools

Design Requirements

f. Mounting locations for door hardware.
g. Door and frame sizes and materials.
h. Keying information.
i. Cross-reference numbers used within the schedule that deviate from those specified.
   1) Column 1: State specified item and manufacturer.
   2) Column 2: State prior approved substituted item and manufacturer.

3. Submittal Sequence:
   a. Submit final schedule at earliest possible date, particularly where acceptance of 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 schedule.
   b. Keying Schedule: Submit separate detailed schedule indicating clearly how the owner’s final instructions on keying of locks has been fulfilled.

E. Templates:
   1. Provide templates for doors, frames and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

F. Material Samples:
   1. Submit samples of door hardware as required by architect.

G. Contract closeout submittals:
   1. Operation and Maintenance Data: Complete information for installed door hardware.
   2. Warranty: Completed and executed warranty forms.
   3. Bitting Records: Complete key bitting records to be submitted to owner’s representative prior to project closeout.

1.5 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.

B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the project’s vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type and quality to that indicated for this project and that employs an experienced architectural hardware consultant (AHC) who is available at reasonable times during the course of the work for consultation to owner, architect and contractor.

C. General contractor to set up and attend the following:
   1. Meet with installer, supplier and representatives of lock, closer and exit device manufacturers prior to commencing installation of door hardware. Instruct installer in proper installation of specified products.
   2. Meet with owner, supplier, and electrical and security contractors to coordinate all electrical hardware items. Supplier to provide wiring diagrams, riser diagrams, elevation drawings and operational narratives as required by the General and sub-contractors.

D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 Standard for Fire Doors and Fire Windows requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals, whether listed in Part 3, Hardware Schedule or not. All hardware is to comply with ANSI/UL 10C Positive Pressure Fire Test of Door Assemblies.

E. Where emergency exit devices are required on fire-rated doors (with supplementary marking on doors’ UL labels indicating “Fire Door to be equipped with Fire Exit Hardware”), provide UL label on exit devices indicating “Fire Exit Hardware.”
F. Coordinate and deliver templates or physical samples of finish hardware items to manufacturer of interfacing items, such as doors and frames, in a timely manner to insure orderly progress of work.

1.6 DELIVERY, STORAGE AND HANDLING:
A. Tag each item or package separately with identification related to final hardware schedule and include basic installation instructions with each item or package.
B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packaged in same container.
C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
D. Deliver individually packaged door hardware items promptly to place of installation (shop or project site).
E. Provide secure lock-up for door hardware delivered to the project but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the work will not be delayed by hardware losses both before and after installation.

1.7 WARRANTY
A. Manufacturers to provide a minimum two (2) year material warranty except as follows:
   1. Provide a thirty (30) year manufacturer’s material warranty for door closers.
   2. Provide a five (5) year manufacturer’s material warranty for mechanical locksets and exit devices.

1.8 MAINTENANCE MATERIALS
A. Extra Materials:
   1. Unless otherwise indicated, provide five (5) percent or a minimum of one, whichever is greater, of the following hardware: locksets, exit devices, closers, and electric or electronic hardware. Transmit to owner’s representative before substantial completion.
B. 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.

2. PART 2 - PRODUCTS
2.1 MATERIALS
A. Butts and Hinges:
   1. Acceptable manufacturers:
      a. Hager
      b. Stanley
      c. Ives*
      d. Bommer
   2. Characteristics:
      a. Width of hinges to be of sufficient size to clear trim and sized in accordance with specified manufacturer’s published recommendations.
      b. Furnish one (1) pair of hinges for door leaves up to 5 feet high. Furnish one (1) additional hinge for every additional 30 inches or fraction thereof.
      c. Butts for doors to be non-rising, loose pins, with button tip. Except as otherwise indicated, provide hinge pins as follows:
         1) Out-Swing Exterior Doors: Non-removable pins.
         2) Out-Swing Corridor Doors with Locks: Non-removable pins.
         3) Interior Doors: Non-rising pins.
         4) Tips: Flat button and matching plug. Finished to match leafs.
      d. Exterior doors to have non-ferrous hinges with stainless steel pins and bearings. Fire-rated doors to have steel or stainless steel hinges.
B. Continuous Hinges:
   1. Acceptable manufacturers:
      a. Ives*
      b. Select
      c. Markar
   2. Characteristics:
      a. Continuous gear hinges to be manufactured of extruded 6063-T6 aluminum alloy with
         anodized finish, or factory painted finish as scheduled.
      b. All hinges to be manufactured to template. Uncut hinges to be non-handed and to be a
         pinless assembly of three interlocking extrusions applied to the full height of the door
         and frame without mortising.
      c. Vertical door loads to be carried on chemically lubricated polyacetal thrust bearings.
         Door and frame leaves to be continually geared together for the entire hinge length and
         secured with a full cover channel. Hinge to operate to a full 180°.
      d. Hinges to be milled, anodized and assembled in matching pairs. Fasteners to be steel
         self-drilling, self-tapping 12-24 x 3/4”.
      e. Provide UL listed continuous hinges at fire doors. Continuous hinges at fire doors to
         meet the required ratings without the use of auxiliary fused pins or studs.
      f. All hinges to have replaceable bearings or carry a life-time warranty.
      g. The following doors to be furnished with full-length continuous gear type hinges:
         1) Student dining and performing arts entries and exits.
         2) Student Multi-Occupancy Toilets.
         3) Locker Rooms.
         4) Gymnasium exits.
         5) 42-inch wide or wider doors.
         6) Corridor doors opening to the exterior.
         7) Vestibule doors.
         8) Cross-corridor doors not equipped with hold-open devices.
         9) Stair doors.

C. Cylinders:
   1. Acceptable manufacturers:
      a. Best Access Systems* Note: Permanent cores supplied by owner.
   2. Characteristics:
      a. Equip locks with cylinders for small format interchangeable-core pin tumbler inserts.
         Furnish only temporary inserts for the construction period and remove these when
         directed by the owner.
      b. Installation of the permanent cores and keys by owner.
      c. Metals: Construct lock cylinder parts from brass or bronze, stainless steel or nickel silver.
      d. Key Material: Provide keys of nickel silver only.
      e. Key Quantity: Provide ten (10) construction master keys and three (3) construction
         control keys. Construction master keys are to be delivered to the contractor with the
         locksets.
      f. Deliver construction master keys and construction control keys to owner. Contact
         Maintenance Coordinator, Mike Peek at (770) 969-3434.

D. Locksets and Trim:
   1. Acceptable manufacturers:
      a. Schlage® L9000 series x 07N (basis of design, owner preferred) meets all of the
         performance characteristics listed below.
   2. Characteristics:
      a. Chassis: cold-rolled steel, handing field-changeable without disassembly.
b. Latchbolts: 3/4-inch throw, stainless steel, anti-friction type.

c. Lever Trim: through-bolted, accessible design, cast lever as scheduled. Spindles: independent break-away.

d. Thumbturns: accessible design not requiring pinching or twisting motions to operate. Provide ADA thumbturns (basis of design: Schlage 09-509 x L583-363).

e. Deadbolts: stainless steel, 1-inch throw.

f. Electric operation: manufacturer-installed continuous duty solenoid.

g. Strikes: curved lip type with exposed edges and corners rounded, of sufficient length to protect jamb and trim, and to not extend more than 1/8 inch beyond trim, jambs or face of doors in pairs. At out-swinging pairs with overlapping astragal, strike to have a 7/8” lip-to-center dimension. Dust box to be provided for door strikes.

h. Scheduled Lock Series and Design: Schlage L series, 07N design.

i. Certifications:
   1) ANSI A156.13, 1994, Grade 1 Operational.
   2) ANSI/ASTM F476-84 Grade 30 UL Listed.

3. Outside lever to be pinned. Inside lever to be by "Allen Head Set Screw" or by "Spanner Ring Nut".

4. Locksets throughout to be lever type of same manufacture.

5. Provide locks with occupancy indicator at all single teacher toilets (Schlage L9480 x 09-611 x L583-375).

6. Provide “classroom security indicator” function (basis of design: Schlage Vandlgard LV9071 x L283-711) with clutching levers and visual verification of locked/unlocked status of outside trim at all classroom doors and where indicated.

E. Exit Devices:

1. Acceptable manufacturers:
   a. Von Duprin*, 98/35 series

2. All exit devices to be one manufacturer. No deviation will be considered.

3. Characteristics:
   a. Unless otherwise specified, exterior doors to be furnished with rim touch bar device. Right hand reverse active leaf - night latch function x cylinder x hardened cylinder ring x pull x sex nuts and bolts. Left-hand reverse inactive leaf - exit only x pull x sex nuts and bolts.

   b. Unless otherwise specified, interior doors to be furnished with rim touch bar device. Right hand reverse active leaf - lever handle x cylinder x sex nuts and bolts. Left hand reverse inactive leaf - exit only x sex nuts and bolts.

   c. All exit devices to be "UL" listed for life safety. All exit devices for fire rated openings to have "UL" labels for "Fire Exit Hardware."

   d. Exit devices throughout to be touch bar types of same manufacture.

   e. Lever design to match lock levers.

   f. Exit devices to be furnished sized for the specific door width and height.

   g. All exit devices mounted on labeled wood doors to be mounted on the door in accordance with the door manufacturer’s requirements.

   h. All trim to be thru-bolted to the lock stile case. All devices to be installed with sex nuts and bolts (SNB).

   i. All exit devices to be made of brass, bronze, stainless steel, or aluminum material, plated to the standard architectural finishes to match the balance of the door hardware. Painted finishes are not acceptable.

   j. Provide glass bead conversion kits to shim exit devices on doors with raised glass beads.

   k. Equip rim exit devices with a roller strike. Provide 499F strikes at all fire rated doors with removable mullions.

   l. All exit devices to be non-handed.
m. Touchpad to extend a minimum of 1/2 of the door width. Touchpad height to exceed height of mechanism case or rail assembly to eliminate pinch parts. If touchpad height does not exceed height of mechanism case/rail assembly, provide insert/filler on top and bottom of touchpad along mechanism case/rail assembly to prevent pinch part. Plastic touch pads are not acceptable.

n. All latchbolts to be the deadlocking type. Latchbolts to have a self-lubricating coating to reduce wear. Plated or plastic coated latchbolts are not acceptable.

o. Where removable mullions are used, provide the type controlled by a key cylinder under the master key system. (KR - key removable). On new additions, use KR mullions on doors where removable mullions are needed.

p. No vertical rod exit devices to be used on exterior doors.

q. Dogging mechanism to be mechanical hook and eye type. No plastic dogging cams to be allowed. Use hex-key type dogging.

r. Exit devices to include impact resistant, flush mounted end cap design to avoid damage due to carts and other heavy objects passing through an opening. End cap to be of heavy-duty metal alloy construction with horizontal adjustment to provide flush alignment with device cover plate. When exit device end cap is installed, no raised edges will protrude.

4. Provide “classroom security indicator” function (basis of design: Von Duprin 98-2SI) with visual verification of locked/unlocked status of outside trim at all classroom doors and where indicated.

F. Door Closers:

1. Acceptable manufacturers:
   a. LCN Closers*, 4040XP X MC,

2. Characteristics:
   a. Door closers to have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.
   b. All closers to utilize a stable fluid withstanding temperature range of 120°F to -30°F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors to be provided with temperature stabilizing fluid that complies with UL 10C.
   c. Spring power to be continuously adjustable over the full range of closer sizes and allow for reduced opening force for the physically handicapped. Hydraulic regulation to be by tamper-proof, non-critical valves. Closers to have separate adjustment for latch speed, general speed and back check.
   d. All closers to have solid forged steel main arms (and forearms for parallel arm closers) and, where specified, to have a cast-in solid stop on the closer shoe ("CUSH"). Where door travel on out-swing doors must be limited, use "CUSH or SCUSH" type closers. Auxiliary stops are not required when “CUSH” type closers are used.
   e. Overhead concealed closers to have spring power adjustable for 50% increase in closing power and fully mortised door tracks.
   f. All closers (overhead, surface and concealed) to be of one manufacturer and carry manufacturer's thirty (30) year warranty. Electric closers to carry manufacturer's two (2) year warranty.
   g. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.
   h. Unless otherwise indicated, closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors to provide for corridor clear width as required by code. Where possible, mount closers inside rooms.
   i. All closers to have full, deep-drawn, one-piece metal covers (MC). Covers with welded or mitered edges are not acceptable.
   j. All closers to be installed with thru-bolts and machine screws (TBWMS).
k. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.

l. Combination Door Closers and Holders: Provide units designed to hold door in open position under normal usage and to release and automatically close door under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.

m. Magnetic Door Holders: Provide heavy duty wall or floor mounted units with metal housing and complete mounting hardware. Provide extensions as required. Provide 24V holding coils unless otherwise scheduled.

n. Door closers to conform to ANSI A156.4, Grade 1, IBC and ADAAG 4.13.10 – Door Closers.

o. Provide spacer block or support bracket for securing fifth screw on closer arm shoe. Provide special brackets, shoes or other attachment devices as required to suit frame and door conditions.

p. Maximum pressure to operate doors to not exceed following:
   1) Fire rated doors: The authority having jurisdiction may determine the maximum force, not to exceed 15.0 lbs, to operate fire doors to achieve positive latching.
   2) Exterior doors: 8.5 lbs.
   3) Interior doors: 5.0 lbs.

q. The general contractor to furnish a certificate, executed by a representative of the closer manufacturer, that all closers have been inspected and adjusted, are operating as designed and have been installed in accordance with the manufacturer’s instructions.

3. Door closers to be installed at the following:
   a. Exterior doors.
   b. Fire rated doors.
   c. Corridor doors.
   d. Toilet Room doors.
   e. Storage Room doors.

G. Power Operators:
   1. Acceptable manufacturers:
      a. LCN*, 4640 series
   2. Characteristics:
      a. Where low kinetic energy, as defined by ANSI Standard A1 56.19, power operators are indicated for doors required to be accessible to the disabled, provide electrically powered 4640 series operators complying with the 1990 ADA for opening force and time to close standards.
      b. Full closing force to be provided when the power or assist cycle ends.
      c. All power operator systems to include the following features and functions:
      d. Provisions for separate conduits to carry high and low voltage wiring in compliance with the National Electrical Code, Section 725-31.
      e. Operator designed to prevent damage to the mechanism if the system is actuated while the door is latched or if the door is forced closed during the opening cycle.
      f. All covers, mounting plates and arm systems to be powder coated and successfully pass a minimum of 100 hours testing as outlined in ANSI Standard A156.18.
      g. UL listed for use on labeled doors.
      h. All operators to be non-handed with spring power over a range of at least four sizes; either 1 through 4 or 2 through 5.
      i. Provisions in the control box or module to provide control (inputs and outputs) for electric strike delay, auxiliary contacts, sequential operation, fire alarm systems, actuators, swing side sensors and stop side sensors.
When an obstruction or resistance to the opening swing is encountered, the operator will pause at that point, and then attempt to continue opening the door. If the obstruction or resistance remains, the operator will again pause the door.

Easily accessible main power and maintain hold open switches provided on the operator.

An electronically controlled clutch to provide adjustable opening force.

A microprocessor to control all motor and clutch functions.

An on-board power supply capable of delivering both 12V and 24V outputs up to a maximum of 1.0 ampere combined load.

All input and output power wiring to be protected by slow blow fuses. Fuses to be easily replaceable without special tools or component replacement.

Actuators to have a stainless steel touch plate that measures 4-1/2" in diameter and features a blue filled handicap symbol. The actuator to be weather resistant and provide normally open momentary contacts. The actuator designed to mount in a standard single gang box (2" wide, 4" high and 2" deep).

Power door operators will be provided with a two (2) year warranty.

Installation of the automatic door operators to be performed by a trained installer, skilled in the installation of automatic door operators and equipment. Factory training provided by the operator manufacturer is recommended. All low voltage switch hookups are the responsibility of the operator installer, as well as temporary wiring hookup to plug into wall outlet for test of system. Final hookup of 115VAC power will be handled by and coordinated with the general contractor’s electrical contractor.

Overhead Door Stops and Holders:

Acceptable manufacturers:

- Glynn Johnson*
- Rixson Firemark

Characteristics:

- Provide heavy duty door stops and holders of stainless steel.
- Stops and holders to be installed with the jamb bracket mounted on the stop.
- All surface-mounted overhead stops and holders to be installed with sex nuts and bolts (SNB).

Door Bolts/Coordinators:

Acceptable manufacturers:

- Trimco
- Ives*
- Rockwood

Characteristics:

- Flush bolts to be forged brass 6-3/4" x 1", with 1/2" diameter bolts. Plunger to be supplied with milled surface one side which fits into a matching guide.
- Automatic flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
- Self-latching flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
- Automatic flush bolts and self-latching flush bolts to be UL listed for fire door application without bottom bolts.
- Coordinator to be soffit mounted, non-handed, fully automatic UL listed coordinating device for sequential closing of paired doors with or without astragals.
- Provide filler pieced to close the header. Provide brackets as required for mounting of soffit applied hardware.
- Rub plate for automatic bolts to be provided for active door.
- Provide dust proof strikes for bottom bolts.
- Provide brackets as required for items fastened to coordinators.
j. Provide door rub plates for both doors with coordinators.

J. Floor Stops and Bumpers:
   1. Acceptable manufacturers:
      a. Trimco
      b. Ives*
      c. Rockwood
   2. Characteristics:
      a. Refer to Part 3, Hardware Schedule.
      b. Floor stops to be mounted to protect door and trim.
      c. Furnish stop of appropriate height, minimum 3/4” above undercut of door.
      d. Where the specified floor stop cannot be installed, or would present a pedestrian hazard, omit and furnish a heavy-duty overhead stop (US32D finish) or, if closer is specified, furnish closer with integral spring-cushion stop arm.

K. Push Plates:
   1. Acceptable manufacturers:
      a. Trimco
      b. Ives*
      c. Rockwood
   2. Characteristics:
      a. Exposed Fasteners: Provide manufacturers standard exposed fasteners.
      b. Material to be extruded/forged, stainless steel. Refer to Part 3, Hardware Schedule.
      c. Plates to be 0.050 thick, 6 inches x 16 inches minimum, beveled on four (4) edges.
      d. Hardware Cutouts: Push plates installed over locking hardware to have cylinder and turn lever cutouts as required.

L. Pull Plates:
   1. Acceptable manufacturers:
      a. Trimco
      b. Ives*
      c. Rockwood
   2. Characteristics:
      a. Provide concealed thru-bolted trim on back to back mounted pulls, but not for single units.
      b. Material to be extruded/forged/cast, stainless steel. Refer to Part 3, Hardware Schedule.
      c. Pulls to have protective plate mounted under pull, 0.050 inches thick, 4 inches x 16 inches beveled on four (4) edges.
      d. Hardware Cutouts: Pull plates installed over locking hardware to have cylinder and turn lever cutouts as required.

M. Push Pull Sets:
   1. Acceptable manufacturers:
      a. Trimco
      b. Ives*
      c. Rockwood
   2. Characteristics:
      a. Refer to Part 3, Hardware Schedule for mounting systems.
      b. Material to be solid rod, stainless steel.
      c. Provide sets sized as shown in Part 3, Hardware Schedule.

N. Protective Plates:
   1. Acceptable manufacturers:
      a. Trimco
      b. Ives*
Appendix Fulton County Schools
Door Hardware Design Requirements

2. Characteristics:
   a. Provide manufacturers standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
   b. Materials:
      1) Metal Plates: Stainless Steel, .050 inch (U.S. 18 gage).
   c. Fabricate protection plates not more than 2 inches less than door width on push side and not more than 1 inch less than door width on pull side.
   d. Heights:
      1) Kick plates to be 8 inches in height.
      2) Mop plates to be 8 inches in height.
      3) Armor plates to be 30 inches in height. Armor plates on fire doors to comply with NFPA 80.

O. Weatherstripping/Gasketing:
   1. Acceptable manufacturers:
      a. National Guard Products*
      b. Reese Industries
      c. Zero Weatherstripping
   2. Characteristics:
      a. Install gaskets and intumescing seals on fire rated doors and frames.
      b. Unless otherwise specified, install weatherstripping on doors from conditioned spaces to the exterior: fastener-applied frame seals, nylon-brush door sweeps and, at pairs of doors, astragals.

P. Thresholds:
   1. Acceptable manufacturers:
      a. National Guard Products*
      b. Reese Industries
      c. Zero Weatherstripping
   2. Characteristics:
      b. Unless otherwise specified, thresholds to conform to accessibility standards ANSI A117.1.

Q. Silencers:
   1. Acceptable manufacturers:
      a. Hager
      b. Ives*
      c. Rockwood
   2. Provide three (3) for each single door; two (2) for each pair of doors.
   3. Omit silencers at openings scheduled to receive perimeter gasketing.

R. Key Cabinet and System:
   1. Acceptable manufacturers:
      a. Telkee
      b. MMF Manufacturing
      c. Key Systems Inc.
   2. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers and permanent markers, all as recommended by system manufacturer, with capacity for 150 percent of the number of locks required for the project.
   3. Provide multiple drawer type cabinet.
S. Security Equipment:
   1. Acceptable manufacturers:
      a. Schlage Electronics*
   2. Characteristics:
      a. Provide items found in Part 3, Hardware Schedule.
      b. Coordinate with electrical systems.

2.2 MATERIALS AND FABRICATION

A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to architect.
   1. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.

D. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.

E. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.

F. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Use thru-bolts for installation of all closers, exit devices, door pulls, and surface-mounted overhead stops and holders. Coordinate with wood doors and metal doors and frames. Where thru-bolts are used, provide sleeves for each thru-bolt as a means of reinforcing the work, or use sex screw fasteners.

2.3 FINISH

A. Unless otherwise specified, finish of hardware to be dull chromium-plated BHMA 652 for steel-based metals, BHMA 626 for brass-based metals, except for kick plate, levers, escutcheons, push plates, continuous hinges, lock strike plates, and exit device touch bars, which are to be BHMA 630. Levers for locksets and exit devices to be BHMA 630.

B. Unless otherwise specified, overhead door closers and brackets to be BHMA 689, to match other finish hardware in same room or space.

C. Match items to the manufacturer’s standard color and texture finish for the latch and lock sets (or push-pull units if no latch of lock sets).

D. Provide finishes that match those established by ANSI or, if none established, match the architect’s sample.

E. 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.

F. The designations used to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
   1. Hinges (Exterior): 630 (US32D) Satin Stainless Steel
   2. Hinges (Interior): 652 (US26D) Satin Chrome Plated Steel
3. Continuous Hinges: 628 (US28) Clear Anodized Aluminum finish to match doors @ aluminum entrance systems
5. Automatic and Constant Latching Bolts: 630 (US32D) Satin Stainless Steel
6. Locks: 630 (US32D) Satin Stainless Steel
7. Exit Devices: 628 (US28) chassis, 689 (Powder Coat) covers, and 630 (US32D) touch pads
8. Door Closers: 689 (AL) Powder Coat Aluminum
10. Pull Plates: 630 (US32D) Satin Stainless Steel
11. Push Pull Sets: 630 (US32D) Satin Stainless Steel
12. Protection Plates: 630 (US32D) Satin Stainless Steel
13. Floor Stops: 626 (US26D) Satin Chrome Plated Brass/Bronze
14. Wall Stops: 630 (US32D) Satin Stainless Steel
15. Overhead Stops and Holders: 630 (US32D) Satin Stainless Steel

PART 3 - EXECUTION

3.1 INSTALLATION
A. Finish hardware to be installed as specified in Finish Hardware Schedule.
   1. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by architect.
      a. “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames” by the Door and Hardware Institute.
   2. Install each hardware item in compliance with the manufacturer’s instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage and reinstallation, or application of surface protection, with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
   3. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
   4. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
   5. Provide necessary screws, bolts, anchors, and fastenings of required sizes and type for proper installation of hardware. Exposed screws to have Phillips heads and wood screws to be fully threaded.
   6. Fitting: Hardware to be accurately fitted and, with exception of prime-coated butt or continuous hinges, bar-type coordinators and flat astragals, to be removed before finish painting is installed. Upon completion of finish painting and/or sealing, permanently install the hardware.
   7. Anchorage of Hardware: Hardware fastened to concrete, masonry or gunite construction to be provided with drop-in expansion anchors by “Red Head Multi Set II” or “Rawl Steel.” Pilot holes of suitably lesser diameter to be drilled prior to the insertion of wood and sheet metal screws.
   8. Door escutcheons and push plates to be installed with stainless steel or bronze, oval, Phillips head fully threaded screws, not less than 3/4 inch - No. 6.
   9. Exit devices to be mounted with non-ferrous sex nuts and fully threaded machine screws, except where through bolts engage outside trim of locking case.
   10. Door closers to be installed for maximum degree of opening of each door.
   11. Following to be installed with sex nuts and fully threaded machine screws.
      a. Door closers
      b. Exit devices

Updated February 27, 2015
c. Door pulls  
d. Surface-mounted overhead stops and holders  

12. Install exterior door stops as required. On new concrete, stops to be installed with 1/4-20 screws. On asphalt concrete, stops to be installed with 1/4-20 screws to an anchor plate set in a concrete monument. Anchor plate to be Trimco 1268, or equal. Floor stops are not to be located in the path of travel and are to be located not more than 4 inches from walls.  

13. Kick plates to be installed with screws at each corner and screws evenly spaced along each side not more than 3 inches apart on centers.  
   a. Except on wood doors, screws to be undercut pan head.  

14. Thresholds to be installed with 1/4-20 screws, Pour-Roc and coped to trim.  
   a. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers."  

15. Sound Seals and Weatherstripping/Gasketing:  
   a. Comply with manufacturer’s instructions and recommendations to the extent installation requirements are not otherwise indicated.  
   b. A mounting screw to be installed within 2 inches of cuts or corners of weatherstripping and/or gasketing.  
   c. Weatherstripping and/or gasketing to be installed with No. 8 - 3/4 inch Tek Phillips pan head screws.  

3.2 ADJUSTING AND CLEANING  
A. Before Substantial Completion, hardware to be cleaned and inspected. Where hardware is deemed defective, repair or replace as required.  
B. Door Closers: Final adjustments to be performed before Substantial Completion, with mechanical system balanced and in operation.  
C. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.  
D. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and perform final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to function properly with final operation of heating and ventilating equipment.  
E. Clean adjacent surfaces soiled by hardware installation.  

3.3 EXAMINATION  
A. Upon completion of installation, verify correct installation of hardware, according to reviewed Hardware Schedule and Keying Schedule. Verify that all finish hardware is in optimum working condition.  
B. Door Hardware Supplier’s Field Service:  
   1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.  
   2. Provide written report of inspection to architect.  
   3. Instruct owner’s personnel in the proper adjustment and maintenance of door hardware and hardware finishes.  
C. Prior to project completion, representatives of the lock, exit device and overhead closer manufacturer(s) to inspect and certify that all units are installed in accordance with the manufacturer’s instructions, are regulated properly and are functioning correctly. Provide written report of inspection to architect and include appropriate certificates of compliance.  

3.4 PROTECTION  
A. Protect the work of this Section until Substantial Completion.  

3.5 FINISH HARDWARE SCHEDULE
GENERAL NOTE:
Future Access control and monitor door preps. Coordinate with electrical and frame/door suppliers.

1. Prepare the following doors for future card readers. See attached elevation for conduit locations.
   Prep for EPT and door monitor switches. Provide covers for preps. Stub for exterior card reader with single gang box with cover.
   Doors: <LIST DOORS>

2. Prepare the following doors for future monitor and request to exit. See attached elevation for conduit locations.
   Prep for EPT and door monitor switches. Provide covers for preps.
   Doors: <LIST DOORS>

<INSERT HARDWARE SETS>

End of Section
# FINISH TABLE

The following table includes a list of flooring and ceiling finish preferences for new FCS projects. Renovation projects may require a deviation from these preferences and must be approved by FCS Facilities.

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<th>Floor Finish</th>
<th>Ceiling Finish</th>
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<tr>
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<td>Synthetic Athletic Flooring</td>
<td>Painted Exposed Structure</td>
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<td>HS and MS Gym</td>
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<tr>
<td>K-1 Classroom Restrooms</td>
<td>Sheet Vinyl Flooring</td>
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<tr>
<td>Classrooms</td>
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<tr>
<td>Corridors</td>
<td>VCT or Polished Concrete</td>
<td>2’x2’ Standard Acoustical Ceiling Tile</td>
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<tr>
<td>Indoor Track</td>
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<tr>
<td>Weight Room</td>
<td>Rubber square tiles with tabs (BOD: “Freeweight”)</td>
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<tr>
<td>PE Locker Rooms</td>
<td>Epoxy Resinous Flooring</td>
<td>Gypsum Board Ceiling</td>
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<tr>
<td>As Specified in Ed Specs (Admin Offices, Media Center, etc.)</td>
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<td>2’x2’ Standard Acoustical Ceiling Tile</td>
</tr>
<tr>
<td>Storage, Mech, Elec Rooms</td>
<td>Sealed Concrete</td>
<td>Exposed Structure</td>
</tr>
</tbody>
</table>
DIVISION 14  ELEVATOR SAMPLE SPECIFICATION

PART 1 GENERAL

1.1 SUMMARY:

A. Work of this section includes hydraulic passenger elevators as shown and specified. Elevator work includes:
   2. Elevator car enclosures, hoistway entrances and signal equipment.
   4. Operation and control systems.
   5. Accessibility provisions for physically disabled persons.
   6. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
   7. Materials and accessories as required to complete the elevator installation.

B. Related sections:
   1. Concrete.
   2. Metals:
      a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
      b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
   3. Finishes.
   4. Plumbing: Sump pit and oil interceptor.
   6. Electrical work:
      a. Providing electrical service to elevators, including fused disconnect switches.
      b. Emergency power supply, transfer switch and auxiliary contacts.
      c. Heat and smoke sensing devices.
      d. Convenience outlets and illumination in machine room, hoistway and pit.

1.2 SUBMITTALS:

A. Product data: When requested, submit product data for the following:
   1. Elevator car enclosures and hoistway entrances.
   2. Operation, control, and signal systems.

B. Shop drawings:
   1. Show equipment arrangement in the machine room/control space, pit and hoistway. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.
   2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
   3. Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.
   4. Indicate electrical power requirements and branch circuit protection device recommendations.

C. Color selection:
   1. Submit color charts of exposed finishes and materials for color selection.
   2. When requested, submit samples of exposed finishes and materials selected for the elevator system materials and components.
D. Certificates: Inspection and acceptance certificates of elevator system installation.

E. Operation and maintenance data. Include the following:
   1. Operation and maintenance instructions.
   2. Parts list, with recommended parts inventory.
   3. Delivery schedule and requirements:
      a. Provide Operation and Maintenance Manual Notebooks no later than 30 days prior to Date of Substantial Completion.
      b. Provide keys, valve schedules, attic stock materials, instruction confirmations and as-built drawings no later than the Date of Substantial Completion.
      c. Deliver keys direct to Owner. Contact Maintenance Coordinator, Mike Peek at (770) 969-3434.
      d. Provide all required warranties, inspection reports, governing certificates and other remaining required items within 30 days following the Date of Substantial Completion.

1.3 QUALITY ASSURANCE:
   A. Manufacturer qualifications: As further specified herein.
   B. Installer qualifications: As further specified herein.
   C. Regulatory requirements:
      1. ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
   D. Fire-rated entrance assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL10(8), and NFPA 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory (2 hour label in Canada).
   E. Inspection and testing: Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
      1. Arrange for inspections and make required tests.
      2. Deliver to the Owner upon completion and acceptance of elevator work.

1.4 DELIVERY, STORAGE AND HANDLING:
   A. Deliver elevator materials, components and equipment in manufacturer's protective packaging.
   B. Store materials in a dry protected area provided by others. Protect and handle materials in accordance with manufacturer's recommendations to prevent damage, soiling, or deterioration.

1.5 PROJECT CONDITIONS:
   A. Painting:
      1. Except as otherwise specified, paint all metal work provided by the elevator manufacturer and installer.
      2. Provide all ferrous metals installed in the hoistway shop primed with a rust
inhibitive primer.

B. Provide the hole for the jack unit (if required by the type of jack provided), based on excavation through normal soil or clay which can be removed by manual digging or by standard truck-mounted regular drilling unit. Provide a casing if required to retain the walls of the hole. General contractor shall remove excavation spoils deposited in the elevator pit.

1. If a physical obstruction or hindrance is encountered below the ground surface, including boulders, rock, gravel, wood, metal, pilings, sand, water, quick sand, caves, public utilities or any other foreign material, obtain written authorization to proceed with excavating using special excavation equipment.

2. Maintain a daily log of time and material costs involved.

3. Elevator contractor will be compensated on a time and material basis for additional costs incurred after encountering the physical obstruction or hindrance, including the cost of the special excavation equipment.

1.6 MAINTENANCE:

A. Furnish maintenance and call back service for a period of six (6) months for each elevator from Date of Substantial Completion.

1. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation.

2. Submit parts catalog and show evidence of local parts inventory with complete list of recommended spare parts. Parts shall be produced by manufacturer of original equipment.

3. Manufacturer shall have a service office and full time service personnel within a 50 mile radius of the project site.

1.7 SERVICEABLE AND MAINTAINABLE EQUIPMENT REQUIREMENTS:

A. The Owner requires that the elevator manufacturer provide the following service and maintenance materials and equipment:

1. Diagnostics: All diagnostics shall be provided onboard.

2. Service tools: No proprietary service tools shall be required for equipment installation, adjustment, maintenance, or troubleshooting.

3. Parts: Spare or replacement parts shall be available at published prices to anyone without restriction.

4. Training: Regularly scheduled technical training classes shall be available at reasonable cost to anyone without restriction.

5. Telephone support: Telephone hotline support shall be available from trained, experienced technicians without charge.

6. Field support: Field engineering support shall be available at the customer's location by prior arrangement at reasonable cost.

7. Documentation: All installation, adjustment, maintenance, and troubleshooting manuals and documents required for proper equipment operation shall be provided with equipment at time of delivery. As-built prints shall be included. Replacement copies of these documents shall be readily available at reasonable cost.

1.8 WARRANTY:

A. Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months from Date of Substantial Completion.
PART 2 PRODUCTS

2.1 HYDRAULIC ELEVATOR:

A. Acceptable manufacturers:
   1. Basis of design: ThyssenKrupp Elevator, Endura Twinpost 3-stage hydraulic elevator.
   2. Otis Elevator Co.

B. Manufacturer qualifications: Elevator manufacturer shall be an approved manufacturer regularly engaged in manufacturing, installing, and servicing elevators of the type required for the project.
   1. Manufacturer shall also be the manufacturer of the power unit, controller, signal fixtures, door operators cab, entrances, and all other major parts of the elevator operating equipment.
   2. The major parts of the elevator equipment shall be manufactured in the United States, and not be an assembled system.
   3. The manufacturer shall have a documented, on-going quality assurance program.

C. Installer qualifications: Installer shall have not less than ten (10) years of satisfactory experience installing elevators equal in character and performance to the project elevators.

D. Elevator characteristics:
   1. Model: Basis of design is ThyssenKrupp Elevator, Endura Twinpost 3-stage hydraulic elevator.
   2. Rated capacity: 2500 lbs.
   3. Rated speed: 100 ft./min.
   5. Travel: 28'-8".
   6. Landings: 3 total.
   7. Openings:
      a. Front: 3.
      b. Rear: 0.
   8. Hoistway size: 8'-8" wide by 5'-9" deep.
   9. Clear car inside: 6'-8" wide by 4'-3" deep.
   10. Cab height: 7'-4" actual.
   11. Hoistway entrance size: 3'-6" wide by 7'-0" high.
   12. Door type: Single Speed.
   13. Power characteristics: 460 volts, 3 Phase, 60 Hz.

2.2 MATERIALS, GENERAL:

A. Colors, patterns, and finishes: As selected by the architect from manufacturer's full range of standard colors, patterns, and finishes.

B. Steel:
   1. Shapes and bars: Carbon, meeting ASTM A36-08.
   2. Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish, meeting ASTM A1008-12a.

C. Aluminum:
   1. Extrusions: Meeting ASTM B221-12a, 6063 alloy.

D. Stainless steel: AISI Type 302/304, #4 satin finish, vertical grain, as specified.
E. Particleboard: Meeting ANSI A208.1, Type M-2, mat formed, manufactured of long
fibered cuttings, weighing minimum of 40 lbs./cu. ft.; fire-retardant treated, meeting
NFPA 101, Class A.

F. Plastic laminate:
   1. Acceptable products:
      a. Arborite.
      b. Formica Corp., Formica.
      c. Panolam, Nevamar.
   2. Conforming to NEMA Standard LD 3, as follows:
      a. Horizontal applications: Grade HGS.
      b. Vertical applications: Grade VGS.
      c. Backing sheet: Grade BKH, undecorated plastic laminate.
      d. Postforming applications: Grade VGP.
      e. Fire-resistant applications: Grade HGP.
      f. Solid color applications: Grade HGS.
   3. Colors, textures and patterns: As selected by architect from full-line selection.

G. Flooring: Vinyl composition tile; refer to Resilient Flooring section.

2.3 HOISTWAY EQUIPMENT:

A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and rigidly
welded with a wood subfloor. Underside of the platform shall be fireproofed.

B. Sling: Steel stiles affixed to a steel crosshead and bolstered with bracing members to
remove strain from the car enclosure.

C. Guide rails: Steel, omega shaped, fastened to the building structure with steel
brackets.

D. Guide shoes: Slide guides shall be mounted on top and bottom of the car.

E. Guide rail lubricators: Provide a leakproof reservoir on top of upper guide shoes.
Wool felt wiper shall apply an even, uniform flow of lubricant which shall thoroughly
cover face of guide rail.

F. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on a steel
template that is fastened to the pit floor or continuous channels fastened to the
elevator guide rail or securely anchored to the pit floor. Provide extensions if
required by project conditions.

G. Jack: Jack unit shall be of sufficient size to lift the gross load the height specified.
Factory test jack to insure adequate strength and freedom from leakage. Brittle
material, such as gray cast iron, is prohibited in the jack construction. Provide the
following jack type:
   1. Twin post holeless telescopic 3-stage. Two jacks piped together, mounted
      one on each side of the car with each having three telescopic sections
designed to extend in a synchronized manner when oil is pumped into the
      Assembly.
   2. Each jack section will be guided from within the casing or the plunger
      assembly used to house the section.
3. Each plunger shall have a high pressure sealing system which will not allow for seal movement or displacement during the course of operation.

4. A follower guide shall be furnished for the top of the lower two plungers and be guided by rollers running inside a steel guide channel which is firmly attached to the guide rail system. This plunger guide system shall maintain a stabilized support for the plunger sections.

5. Each Jack Assembly shall have check valves built into the assembly to allow for automatically re-syncing the three plunger sections by moving the jack to its fully contracted position.

H. Terminal limit switches: Place limit switches in the hoistway near the terminal landings. Limit switches shall be designed to cut off the electric current and stop the car if it runs beyond either terminal landing.

I. Automatic self-leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the landings and correct for overtravel or undertravel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

J. Failure protection: Design electrical control circuit so if a malfunction occurs, due to motor starter failure, oil becoming low in the system, or the car failing to reach a landing in the up direction within a pre-determined time, the elevator car will automatically descend to the lowest terminal or other designated landing. If power operated doors are used, the doors will automatically open when the car reaches that landing to allow passengers to depart. The doors will then automatically close and all control buttons, except the "door open" button in the car station, shall be made inoperative.

K. Wiring, piping, and oil: Provide all necessary hoistway wiring in accordance with the National Electrical Code. All necessary code compliant pipe and fittings shall be provided to connect the power unit to the jack unit. Provide proper grade oil as specified by the manufacturer of the power unit.

L. Emergency terminal stopping device:

1. Provide emergency terminal stopping devices for speeds over 100 FPM. The emergency terminal stopping device shall operate independently of the normal terminal stopping device if it should fail to slow the car down at the terminal landing as intended. Stopping devices shall not be prevented from functioning by a single short circuit caused by a combination of grounds or by other conditions.

2. Normal and emergency terminal stopping devices shall not control the same controller switches unless two or more separate and independent switches are furnished, two of which shall be closed in either direction of travel to complete the circuit to the control valve solenoids in the down direction and to complete the circuit to the pump motor for the up direction of travel.

2.4 POWER UNIT:

A. Power unit (Oil Pumping and Control Mechanism): Basis of design is ThyssenKrupp, EP2 Power Unit. Power unit shall be a self-contained unit consisting of the following items:

1. Oil reservoir with tank cover.
2. An oil hydraulic pump.
3. An electric motor.
4. Oil control valve with the following components built into single housing; high pressure relief valve, check valve, automatic unloading up start valve, lowering and leveling valve, and electro-magnetic controlling solenoids.

B. Pump: Positive displacement type pump specifically manufactured for oil-hydraulic elevator service. Pump shall be designed for steady discharge with minimum pulsation to give smooth and quiet operation. Output of pump shall not vary more than 10 percent between no load and full load on the elevator car.

C. Drive: Drive shall be by direct coupling with the pump and motor submerged in the oil reservoir or by multiple V-belts and sheaves of number and size to insure maximum factor of safety. Drive type shall be determined based primarily on the load on the car, travel, and speed.

D. Motor: Standard manufacture motor specifically designed for oil-hydraulic elevator service. Duty rating shall be selected for specified speed and load.

E. Oil control unit: The following components shall be built into a single housing. Welded manifolds with separate valves to accomplish each function are not acceptable. Adjustments shall be accessible and be made without removing the assembly from the oil line.
   1. Relief valve shall be externally adjustable and be capable of bypassing the total oil flow without increasing back pressure more than 10 percent above that required to barely open the valve.
   2. Up start and stop valve shall be adjustable and designed to bypass oil flow during start and stop of motor pump assembly. Valve shall close slowly, gradually diverting oil to or from the jack unit, ensuring smooth up starts and up stops.
   3. Check valve shall be designed to close quietly without permitting any perceptible reverse flow.
   4. Lowering valve and leveling valve shall be adjustable for down start speed, lowering speed, leveling speed and stopping speed to ensure smooth "down" starts and stops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling after slowdown is initiated.

F. Power controller shall contain electrical contractors, electro-mechanical switches and current overload relays. Mount components in a NEMA 1 enclosure. Logic control system shall be microprocessor based and protected from environmental extremes and excessive vibrations.

G. Solid state starting: Provide an electronic reduced voltage starter featuring adjustable starting currents.

2.5 HOISTWAY ENTRANCES:

A. Doors and frames: Provide complete hollow metal type hoistway entrances at each hoistway opening.
   1. Manufacturer’s standard entrance design consisting of 14 gauge frames with 2 inch (50 mm) profile, 18 gauge doors, hangers, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.
   2. Elevator wall interface with hoistway entrance assembly shall comply with elevator manufacturer’s requirements.
   3. Doors: Flush construction
      a. Main landing: ASTM A1008-12a steel panels, factory-applied baked
enamel finish.
b. Typical landings: ASTM A1008-12a steel panels, factory-applied baked enamel finish.

a. Main landing: Cold-rolled sheet steel with factory-applied baked enamel finish.
b. Typical landing: Cold-rolled sheet steel with factory-applied baked enamel finish.

B. Interlocks: Equip each hoistway entrance with an approved type interlock tested as required by code. Interlocks shall be designed to prevent movement of the car away from the landing until the doors are locked in the closed position as defined by code and shall prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing.

C. Door hanger and tracks: Provide sheave type two point suspension hangers and tracks for each hoistway horizontal sliding door.
1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
2. Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during operation.
3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

D. Hoistway sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum at the main landing and at typical landings.

2.6 CAR ENCLOSURE:
A. Car enclosure:
1. Walls: Cab type TKLP, durable wood core finished on both sides with high pressure plastic laminate.
2. Canopy: Reinforced 14 gauge cold-rolled steel with hinged exit. Finish: Two coats factory applied reflective baked enamel.
3. Ceiling: Suspended type, fluorescent lighting with translucent diffuser mounted in a metal frame.
   b. Panel finish: Not Applicable
5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.
   a. Door finish: Stainless steel panels: No. 4 brushed finish.
   b. Cab sills: Extruded aluminum, mill finish.
6. Handrail: Provide 1.5" diameter cylindrical metal handrail on side and rear walls. Handrails shall have a stainless steel, no. 4 brushed finish.
7. Ventilation: Two speed exhaust fan mounted on the car top.
8. Protection pads: Provide one set of protection pads.
9. Finished Floor: Vinyl composition flooring; refer to Resilient Flooring section.

B. Car top inspection: Provide a car top inspection station with an "Auto-Inspection" switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative.
The station will give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.

2.7 DOOR OPERATION:

A. Door operation: Provide a direct current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. Closed-loop, microprocessor controlled motor-driven linear door operator, with adjustable torque limits, also acceptable. AC controlled units with oil checks or other deviations are not acceptable.

1. No un-necessary door operation: Car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as the next car up.

2. Door open time saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.

3. Double door operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel will reverse and the door will reopen to answer the other call.

4. Nudging operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door movement is obstructed for a field programmable time, a buzzer will sound. If the multiple beam infra-red door protection system detects a person or object while closing, the doors will stop and resume closing after the obstruction has been removed.

5. Limited door reversal: If the doors are closing and an infra-red beam is interrupted, the doors will reverse and reopen partially. After the obstruction is cleared, the doors will begin to close.

6. Door open sentinel: If the doors are opening, but do not fully open after a field adjustable time, the doors will recycle closed then open six times to try and correct the fault.

7. Door close sentinel: If the doors are closing, but do not fully close after a field adjustable time, the doors will recycle open then close six times to try and correct the fault.

8. Door close assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.

B. Door protection devices: Provide a door protection system using 154 microprocessor controlled infra-red light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen. A mechanical reopening device is not acceptable.

2.8 CAR OPERATING STATION:

A. Car operating station, general: The main car control in each car shall contain the devices required for specific operation mounted in an integral swing return panel requiring no applied faceplate. Swing return shall have a brushed stainless steel
finish. The panel shall consist of the following pushbuttons, key switches and indicators:

1. The bottom of the Car Operating Station shall contain the "door open," "door close," "alarm" buttons and a keyed "emergency stop" switch.
2. The Intermediate area of the station shall contain floor buttons which illuminate when a call is registered and remain illuminated until the call is answered. Raised floor indications and handicap symbols shall be located to the left and immediately adjacent to the floor buttons. No applied symbols or floor indications or symbols on the buttons shall be permitted.
3. The next level shall contain supplied options switches.
4. The top of the Car Operating Station shall contain fire service features, including operating instructions, in accordance with ASME A17.1 and any local code.

B. Position indicator: A position indicator shall be contained above floor push buttons. As the car travels, its position in the hoistway shall be indicated by the illumination of the alpha/numeric character corresponding to the landing which the elevator is stopped at or passing.

C. Emergency light: Emergency light, capacity plate, and elevator number shall be integrated into the top module. The emergency light shall consist of white LED’s and be capable of putting out a minimum of four (4) foot candles, one foot out and four foot in front of the car swing panel. The emergency light will illuminate automatically upon loss of the building’s normal power supply.

D. Emergency communications system: Provide an emergency communications device mounted integrally within the swing return. Emergency communications device shall comply with Americans with Disabilities Act (ADAAG) requirements.

E. Auxiliary operating panel: Not Required

F. Column mounted car riding lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

G. Include the following special controls:
   1. Independent service switch.
   2. Inspection switch.
   3. Two speed fan/light switch.

2.9 CONTROL SYSTEMS:

A. Controller:
   1. The elevator control system shall be microprocessor based and software oriented and be linked together for purposes of communication by a serial communications link. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.
   2. Momentary pressing of one or more buttons shall dispatch the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed. Each landing call shall be canceled when answered.
   3. When the car is traveling in the up direction, it shall stop at all floors for
which car buttons or "up" hall buttons have been pressed.
a. The car shall not stop at floors where "down" buttons have been
pressed, unless the stop for that floor has been registered by a car
button or unless the down call is at the highest floor for which any
buttons have been pressed.
b. Pressing the "up" button when the car is traveling in the down
direction shall not intercept the travel unless the stop for that floor
has been registered by a car button or unless the up call is the
lowest for which any button has been pressed.

4. When the car has responded to its highest or lowest stop, and stops are
registered for the opposite direction, its direction of travel shall reverse
automatically and it shall then answer the calls registered for that direction.
If both up and down calls are registered at an intermediate floor, only the
call corresponding to the direction of car travel shall be canceled upon the
stopping of the car at the landing.

B. Microprocessor: Locate the main microprocessor and car controller in the
elevator machine room, control space or hoistway.
1. Microprocessor for door operator shall reside in the door operator
and control all functions of the elevator door(s). Communication to
the car controller shall be serial.
2. Electronic selector shall reside on the car top and contain hall effect
transducers that detect magnetic fields. Magnets, corresponding to
floor positions and top/bottom of hoistway are mounted on a perforated
metal tape that runs the length of the hoistway.

C. Provide simplex operation

D. Provide a key operated switch in the elevator for the purpose of removing the car
from normal operation. When the switch is in the "independent service" position,
the elevator will bypass all landing calls and answer only car calls. The operator
will have complete control over the operation of the car.

E. Emergency power operation: (10-DOA) Upon loss of the normal power supply,
building-supplied standby power is available on the same wires as the normal
power supply. Once the loss of normal power is detected and standby power is
available, the elevator is lowered to a pre-designated landing and the doors are
opened. After passengers have exited the elevator, the doors are closed and
the car is shut down. When normal power is restored, the elevator
automatically resumes operation.

F. Limited access features:
1. Elevator signals shall be key-activated only.
2. When activated by key, pushbuttons will operate. Include button for
each floor, door open button and alarm buttons, electronic passenger
sensing device key switch and fan light key switch.

2.10 HALL STATIONS:

A. Hall stations, general:
1. Provide buttons with red-illuminating LED halos to indicate that a call
   has been registered at that floor for the indicated direction. Provide 1
   set of pushbutton risers.
2. Provide one set of pushbutton risers with faceplates having a brushed
   stainless steel finish.
3. Each terminal station shall contain one illuminating push button.
4. Each intermediate station shall consist of two illuminating pushbuttons, one for
the up direction and one for the down position.

5. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station at the designated level.

B. Floor identification pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.

C. Hall position indicator: Not Applicable

D. Hall lanterns: Not required for this application. Refer to column mounted car riding lantern as herein specified.

2.11 MISCELLANEOUS ELEVATOR COMPONENTS:

A. Oil hydraulic silencer: Install an oil hydraulic silencer (muffler device) at the power unit location. The silencer shall contain pulsation absorbing material inserted in a blowout proof housing arranged for inspecting interior parts without removing unit from oil line. Rubber hose without blowout proof features will not be acceptable.

B. Vibration pads: Mount vibration pads under the power unit assembly to isolate the unit from the building structure.

C. Sound insulating panels: When pump and motor are not submerged, provide panels manufactured of reinforced 14 gauge steel with 1 inch (25 mm) thick 1-1/2 pound fiberglass core attached to interior and mounted on all four open sides of the power unit frame.

D. Sound isolating couplings: When pump and motor are not submerged, install a minimum of two isolation couplings in the oil line in the machine room between pump and jack.

E. Provide all code required signage at each floor. Coordinate with Signage specifications.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and machine rooms/control space, as constructed and verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.2 INSTALLATION:

A. Install elevator systems components and coordinate installation of hoistway wall construction.

1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.

2. Comply with the National Electrical Code for electrical work required during installation.

B. Perform work with competent, skilled workmen under the direct control and supervision of the elevator manufacturer's experienced foreman.
C. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports, and bracing including all setting templates and diagrams for placement.

D. Jack unit excavation: Drill or otherwise excavate below elevator pit construction as required to install the jack unit.
   1. Install casing for jack unit.
   2. Provide HOPE jack protection system for all in ground jacks.
   3. Set casing for jack unit assembly plumb, and partially fill with water-settled sand, eliminating voids. Back fill depth shall be sufficient to hold the bottom of the jack in place over time.

E. Set jack unit-cylinder assembly plumb, centered accurately and shimmed to proper elevation, using centering lugs to prevent dislocation during filling. Fill space between casing and cylinder with clean, dry, compacted sand.

F. Welded construction: Provide welded connections for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn Parts. Comply with AWS standards for workmanship and for qualification of welding operators.

G. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.

H. Install machinery, guides, controls, car and all equipment and accessories to provide a quiet, smoothly operating installation, free from side sway, oscillation or vibration.

I. Sound isolation: Mount rotating, vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent the transmission of vibrations to the structure, and eliminate sources of structure-borne noise from the elevator system.

J. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.

K. Erect hoistway sills, headers, and frames before erection of rough walls and doors; erect fascias and toe guards after rough walls are finished. Set sill units accurately aligned and slightly above finish floor at landings.

L. Lubricate operating parts of system where recommended by manufacturer.

3.3 FIELD QUALITY CONTROL:

A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required by A17.1 Code and local authorities having jurisdiction. Perform other tests, if any, as required by governing regulations or agencies.

B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.
3.4 ADJUSTING:
A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

3.5 CLEANING:
A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless stall shall be cleaned with soap and water and dried with a non-abrasive surface; shall not be cleaned with bleached-based cleansers.

B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.

3.6 PROTECTION:
A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

3.7 TRAINING AND DEMONSTRATION:
A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators.
   1. Owner orientation and instruction:
      a. Provide a training schedule spreadsheet for distribution to Owner one week before training.
      b. Provide video record of training for future reference.
      c. Coordinate delivery of Maintenance Manuals one week before training sessions.
   2. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies.
   3. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.

B. Make a final check of each elevator operation, with Owner's personnel present, immediately before Date of Substantial Completion. Determine that control systems and operating devices are functioning properly.

End of Section
DATA CABLELING SYSTEM

NOTE: Contact Fulton County Schools for current specification information regarding D Cabling System.

1. Horizontal Cable – Balanced twisted-pair also referred to as unshielded twisted-pair (UTP)
   (a) 23 AWG/4 pair – UTP
   (b) Cable must be manufactured by CommScope
   (c) Jacket color – Pink
   (d) Category 6
   (e) CMP or CMR flammability rating as determined by local codes
   (f) Cable must be factory certified to 400 MHz minimum and include test report which meets or exceeds the performance specifications set for CommScope 7504 UltraMedia Category 6 cable
   (g) The manufacturers channel warranty shall support a 4-connector channel that covers all category 6 balanced twisted-pair applications approved by the Institute of Electronic and Electrical Engineers (IEEE), The ATM Forum, the American National Standards Institute (ANSI) and the International Organization of Standardization (ISO) that specify compatibility with the cabling referenced herein. Examples of applications that are covered by the vendor warranty include Gigabit Ethernet (IEEE 802.3ab) and 155 Mb/s ATM.
   (h) Meet North American Standards – ANSI/TIA/EIA-568-B.2-1 and all applicable addenda.

2. Fiber backbone – main distribution frame (MDF) to horizontal and or intermediate distribution frame (IDF)
   (a) Minimum – 12 fibers between distribution frames – adhere to manufacturer’s installation procedures. All 12 fibers must be terminated.
   (b) Star configuration
   (c) Fiber cable must be manufactured by CommScope
   (d) Routed through Trade size 1 innerduct. CommScope Fiber Guard interlocking armored fiber cable may be used instead of innerduct.
   (e) Below grade runs must use indoor/outdoor rated or outdoor rated water blocking fiber cable.
   (f) 50/125 μm LOMMF – OM3 laser certified multimode fiber
   (g) Transmission performance – Fiber cable must be DMD (Differential Mode Delay) tested and meet or exceed the performance specifications set for CommScope LaserCore 300™ Type 5L multimode fiber:
   (h) Cables must meet OFNR or OFNP determined by local code.

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<th>Optical Characteristics</th>
<th>850 nm</th>
<th>1300 nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum attenuation</td>
<td>3.0 dB/km</td>
<td>1.0 dB/km</td>
</tr>
<tr>
<td>Bandwidth OFL</td>
<td>1500 MHz *km</td>
<td>500 MHz *km</td>
</tr>
<tr>
<td>Bandwidth Laser</td>
<td>2000 MHz*km</td>
<td>500 MHz*km</td>
</tr>
<tr>
<td>Guaranteed 10 Gigabit</td>
<td>300 m</td>
<td></td>
</tr>
</tbody>
</table>

Updated February 27, 2015
3. Cable Supports – 3 options
   (a) Wire basket cable tray above ceiling – trapeze style supported with threaded rod and associated hardware
   (b) Without wire basket using threaded rod and J-Hooks
   (c) Gridwire and J-Hooks
      (i) J-Hooks placed every 4-5 feet. Follow manufacturer’s guidelines.
      (ii) Number of cables per J-Hook is based upon J-Hook size. Follow manufacturer’s guidelines.
      (iii) Support method must not exceed support or cable manufacturers required weight and or cable quantity limits.

4. Surface mount raceway for horizontal (station) cables
   (a) Size of surface mount raceway will depend on number of cables.
   (b) Surface mount raceway to be secured neatly to all surfaces – cut to length.
   (c) Must be installed per the manufacturers recommendations.

5. Firestopping
   Where data cables penetrate fire rated walls, floors and ceilings fireproof the opening. Provide conduit sleeves for cables that penetrate fire rated walls. After the cabling installation is complete install fire proofing material in and around all conduit sleeves and openings. Install fireproofing material thoroughly and neatly. Seal all floor, wall and ceiling penetrations. When installing in existing installations all breached fire stopped openings must be returned to original condition.

6. Grounding, Bonding
   (a) Attach a #6 bare, solid ground wire from a local ground bar to each equipment rack/cabinet/tray using appropriate ground lugs.
   (b) Contractor to conform to NEC, EIA, ANSI, ASTM, UL, BICSI, and local regulations.

7. UTP Cabling Installation
   (a) All data cabling shall be installed per ANSI/BICSI/NECA-568, ANSI/TIA/EIA 568-B.1, ANSI/TIA/EIS-568-B.2, ANSI/TIA/EIA-568-B.2-1, ANSI/TIA/EIA-568-B.3 and local building codes.
   (b) Leave 1.5 m to 3 m (5-10 ft) of service loops near both workstation and data rack. Service loops are to be coiled neatly at both ends. Caution: coils should be made in large loops and preferably in figure eights to avoid transmission performance issues.
   (c) Do not exceed a total cable length of 90 meters of any data UTP cable from outlet to patch panel termination. Overall channel link – (cable and 2 patch cables) not to exceed 328 feet.
   (d) Do not lay data cables on top of light fixtures, ceiling tiles, mechanical equipment or ductwork. Maintain at least 0.6 m (2ft) clearance from all shielded apparatus. All cables must be supported using approved method from Section 3.
   (e) All classrooms, offices, teacher work areas, the Media Center, and any other space that may accommodate a computer will be wired for the network. All network drops must provide two (2) network data connections. Each classroom must be equipped with two drops for the students and one drop for the teacher (a total of six connections in each classroom). For computer labs and other multi-drop areas
include a data connection for each network device (computer, printer, etc.). Placement of network drops in these areas shall be determined by the room layout, computer furniture and other factors. Submit floor plans for mark-up at the appropriate phase in design.

(f) Network drops to support ceiling mounted wireless access point devices shall be terminated with an 8 contact modular plug, Siemon part number P-8-8, on the work area end and be coiled with a 20 foot service loop. The service loop will be supported above the ceiling by wire tie to a J hook or other structural support.

8. Category 6 Connectivity
   (a) Patch Panels
      1) 48-port RJ45 modular to 110 with (6) or (8) ports
      2) Wired 568B
      3) Standard or high density – 19” wide
      4) Rack or wall mount
      5) Designation strips – front and rear
      6) All Patch Panels and hardware must be manufactured by the Siemon Company.

   (b) RJ45 modular jacks 8P8C
      1) Wired 568B
      2) 45° exit
      3) Dual Siemon CT jacks only
      4) 110 type termination
      5) All jacks must be manufactured by the Siemon Company.

9. 50/125 Multimode fiber connectivity
   (a) Connectors
      1) SC Simplex only – composite or ceramic ferrule
   (b) Fiber patch panels
      1) Rack and wall mount
      2) 12 fiber adapter panels (SC Connectors only)
      3) Splice trays if needed
      4) All fiber patch panels and adapters must be manufactured by the Siemon Company.

10. Patch cables – Category 6
    (a) Copper
        1) Color-coded – (blue)
        2) 4-pair – 24 AWG Stranded – PVC
        3) Snag less Boot
4) Lengths – not to exceed 6 m (20 ft)
5) Every cord must be 100% factory performance tested with a network analyzer and test reports must be included with every shipment.

(b) Fiber Multimode
1) Duplex
2) Terminated with appropriate connector (to mate with fiber panels)

11. Racks and Cabinets
(a) Racks – universal self-supporting
1) 7 feet tall – 19” mounting space (23” if needed)
2) Bolt racks securely to floor

12. Wire management
(a) Horizontal – single or double space
1) 19” or 23” rack mount
2) Wire managers to be mounted between patch panels
3) Ladder-rack from top of racks – secured to back wall in MDF and IDF’s

(b) Vertical
1) Between racks – single or double-sided

13. Labeling
(a) Furnish and install all labels throughout the entire system. Labels should be attached securely so that they will not peel off. All labels shall be machine generated or as approved.
(b) Labels should indicate telecommunications room and port number: Example IDF2-A12 would be IDF room number 2, patch panel “A”, port number 12.
(c) Label the following: faceplates, cable at each outlet (within 200 mm (8 in) of the termination, cable at the rear of patch panels (within 200 mm (8 in) of the termination, front of patch panel for each termination, all voice MDF and IDF blocks.
(d) Wireless access point drops shall be labeled as indicated in 13.b and 13.c of this document. Since wireless access points do not have faceplates attach the labels with plenum rated wire-ties or other methods suitable for plenum spaces.
(e) Submit proposed labeling scheme to FCS Information Technology for approval prior to installation

14. Testing
(a) Category 6

Each cabling permanent link or channel shall be tested and certified. Each pair of the permanent link or channel shall be tested. The permanent link measurement is recommended although the entire channel may be tested. The entire channel includes the patch cables at the workstation end of the permanent link to the patch cables at the patch panel end. All links must be tested using test heads with Siemon Company patch cords.

Each outlet must pass the following parameters for category 6 as described in ANSI/TIA/EIA-568-B.2-1: wire map, length, insertion loss, NEXT, Power Sum NEXT, ELFEXT, Power Sum ELFEXT, Return Loss, Propagation Delay, Delay Skew.

- All tests shall be favorable, no *PASS, *FAIL or FAIL results will be accepted.
All test results shall be turned over to the owner in both electronic files and in hard copy.

(b) Fiber Optic
1) Optical fiber (backbone) cables shall be 100% tested for attenuation and length.
2) Testing will be done with an optical power meter and light source.
3) Length shall be recorded using an OTDR, optical length test measurement device or sequential cable measurement markings. Attenuation shall be tested at 850 nm and at 1300 nm for multimode fiber cable
4) All test results shall be turned over to the owner in both paper and electronic format.
5) Each strand shall not exceed a level of:
   - 3.5 db/km of attenuation for 850 nm
   - 1.5 db/km of attenuation for 1300 nm
6) Each strand shall be tested and the following information be turned over to the owner
   - From point to point
   - Fiber I.D. label number
   - RX level
   - Attenuation total
   - Wave length
   - Reference level

15. MDF – Main Distribution Frame
(a) Two dedicated (3) wire 208V AC 30 ampere rated circuits with L6-30R Locking Receptacles must be provided in all schools to accommodate special Information Technology equipment racks. There should be no more than 12 inches distance between the two receptacles. Location of the two receptacles to be determined by Technology Services.
(b) A minimum of four duplex 20 ampere 120V AC outlets on separate dedicated circuits to support data rack equipment. Position circuits behind the data racks.
(c) Room size should be at least 10 ft. X 16 ft
(d) Room must have a dedicated climate control system capable of maintaining a 70 degree Fahrenheit room temperature at a minimum heat load of 20,000 BTU. An adjustable thermostat for room temperature must be provided. The climate control system must be a continuously available system.
(e) At least one closet wall shall be lined with ¾” plywood – 8 ft. tall – painted with fire retardant paint
(f) Racks and cabinets should be placed so that there are at least 3 feet from the wall to the rear of both racks and cabinets and at least 3 feet from any wall or obstruction to the front of racks and cabinets. Racks and cabinets must have at least 3 feet of clearance on both sides. Only Information Technology approved items may be mounted on the wall space behind the data racks.
(g) All equipment must be properly grounded

16. IDF – Intermediate Distribution Frame and HC/IC
(a) Minimum of two duplex 20 ampere 120V AC electrical outlets on separate dedicated branch circuits positioned behind the data racks.
(b) Closets must be climate controlled
(c) Size of closet will depend on the number of square feet that it will serve
(d) Racks and cabinets should be placed so that there is at least 3 feet from wall to the rear of racks and cabinets and at least 3 feet from any wall or obstruction to the front of racks and cabinets. Racks and cabinets must have at least 3 feet of clearance on both sides. Only Information Technology approved items may be mounted on the wall space behind the data racks.

(e) There may be cases where equipment may have to be wall-mounted

(f) All equipment must be properly grounded

(g) At least one closet wall shall be lined with ¾” plywood – 8 ft. tall – painted with fire retardant paint

17. Warranties

- The contractor shall provide a 5-year warranty on all contractor provided material and workmanship. Owner will also receive a 20-year manufacturer’s warranty. There shall be a 20-year, 250 MHz transmission warranty.

18. Miscellaneous

- All participants in any network-wiring project must be Siemon certified. In addition all patch panels, data outlets, fiber connectors and other hardware items must be manufactured by the Siemon’s company.

- These cabling specifications apply to all construction projects. Where renovations are done and existing equipment is replaced, testing of the entire network at the facility must be performed in accordance with these specifications to ensure continuity between existing and new construction.

- A pre-construction meeting involving the data cabling contractor and FCS Information Technology shall be stipulated in the project manual.

- Periodic meetings and site visits should be conducted during the installation of all cabling systems.

- A post-construction meeting involving the data cabling contractor and FCS Information Technology shall be stipulated in the project manual.

- All products must be purchased from an authorized distributor of each manufacturer.
TELEPHONE Cabling System

NOTE: Contact Fulton County Schools for current specification information regarding Telephone Cabling System.

Fulton County Schools will provide the telephone switch and individual phones for each required location. Construction contract shall provide telephone cabling and equipment as noted below.

1. Telephone Equipment Room
   a. Two 4 x 8 foot plywood sheets mounted on the same wall side by side for telephone system and equipment mounting. Plywood to be painted with fire retardant paint. Plywood to be mounted where two 4 inch conduits stub up from street or other telephone service provider location.
   b. Provide #6 ground wire mounted on plywood.
   c. One quad 120 volt outlet supported by the emergency generator mounted near the plywood.
   d. Lighting for this room to be on emergency power circuit.
   e. Two 4 inch conduit sleeves above the ceiling between room and hall.
   f. All cables to be terminated on Siemon Company 66M150 blocks with brackets.
   g. All station and feeder cables must feed up from the bottom of the 66 blocks.
   h. Use metal D rings.
   i. One 4 inch conduit between telephone equipment/entrance room and the data MDF room for the wide area Ethernet fiber circuit.
   j. Two 4 inch conduits to the street for telephone service provider’s connection. These conduits usually stub up by a utility pole but this requirement must be verified by the building contractor and the telephone service provider. Pull boxes required for long runs. AT&T specifications for conduits provided by area AT&T BIC engineer.

2. Feeder Cables
   a. One 50 pair plenum rated feed cable will run from the telephone equipment room to each IDF closet. Terminate feed cable on Siemon Company 66M150 blocks. All cable to be manufactured by CommScope.
   b. Two 4 inch sleeves between IDF and hall above the ceiling for feeder and station cables.

3. Station Cables
   a. Use CommScope 7504 UltraMedia Category 6 plenum rated gray jacketed cable for all station cables.
   b. Terminate all station cables with Siemon Company CT-CS-C5-02 jacks.
   c. Sleeve through walls for station cable runs using ¾ inch conduit above the ceiling.
   d. Telephone station cables to be provided for all offices and other work areas where telephone service is required.

4. Cable Supports – 3 options
   a. Wire basket cable tray above ceiling – trapeze style supported with threaded rod and associated hardware
   b. Without wire basket using threaded rod and J-Hooks
   c. Gridwire and J-Hooks
      i. J-Hooks placed every 4-5 feet. Follow manufacturer’s guidelines
ii. Number of cables per J-Hook is based upon J-Hook size. Follow manufacturer’s guidelines.

iii. Support method must not exceed support or cable manufacturers required weight and or cable quantity limits.

5. Other Telephone Locations
   a. High Schools require 25 pair feed cable from the telephone entrance/equipment room to the stadium home field side electrical room to support telephones. Terminate on Siemon Company 66M150 blocks.

6. Labeling
   a. Furnish and install all labels throughout the entire system. Labels should be attached securely so that they will not peel off. All labels shall be machine generated or as approved.
   b. Labels should indicate telecommunications room and position number: Example IDF2-V12 would be IDF room number 2, 66Block position 12.
   c. Submit proposed labeling scheme to FCS Information Technology for approval prior to installation.

7. Miscellaneous
   a. All cabling must be manufactured by the CommScope Company.
   b. All participants in any telephone-wiring project must be Siemon certified. In addition all jacks, faceplates, 66blocks and other connectivity items must be manufactured by the Siemon Company.
   c. A pre-construction meeting involving the telephone cabling contractor and FCS Information Technology shall be stipulated in the project manual.
   d. A post-construction meeting involving the telephone cabling contractor and FCS Information Technology shall be stipulated in the project manual.
   e. Periodic meetings and site visits should be conducted during the installation of all cabling systems.
   f. All products must be purchased from an authorized distributor of each manufacturer.
   g. Contractor to conform to NEC, EIA, ANSI, ASTM, UL, BICSI, and local regulations.

8. Warranties
   The contractor shall provide a 5-year warranty on all contractor provided material and workmanship. Owner will also receive a 20-year manufacturer’s warranty.
INTERCOMMUNICATIONS EQUIPMENT

GENERAL

NOTE: Contact Fulton County Schools for current specification information regarding Communications Control Center.

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the Central Sound/Communications Control Center which shall be a Rauland Telecenter ICS System, offering the combined features and functions of both systems. Systems not providing these specified features will not be considered. Furnish all labor, materials, tools and equipment necessary for complete installation and checkout of the system as outlined in these specifications. The equipment shall be Rauland equipment (NO EXCEPTIONS) as furnished by SWC - Richardson Technology Systems.

B. The administrative telephone communication system shall be a Rauland Telecenter ICS providing at least the following features and functions:

The Administrative Control Center shall be a standard pushbutton dialing telephone complete with solid-state pre-tuned tone oscillators identical to those employed by the public telephone companies.

The Central Switching Exchange shall be a Global Switching System, that is, there shall be no linking within the system that would restrict or block telephone communications.

Direct dialing private two-way telephone communications between all locations equipped with administrative telephone and staff telephone shall also be provided.

The Central Switching Exchange shall have facilities for 32 full duplex unrestricted simultaneous private telephone conversations between administrative telephones and between administrative telephones and staff telephones.

Facilities for automatically sounding a warning tone signal over any loudspeaker selected for two-way "amplified voice" communication. The warning tone signal shall sound as soon as the station is selected, and shall be automatically repeated at regular intervals.

Direct-dialing, two-way "amplified voice" communications between all locations equipped with administrative telephones and staff (classroom) loudspeakers without the use of a press-to-talk or talk-listen switch.

The Central Switching Exchange shall have facilities for multiple (12) watt two-way "amplified voice" communication channel(s), providing simultaneous communication on each channel from administrative telephones. Provide one channel under this contract.

Automatic Queuing shall be provided for the two-way amplified voice communication channels. A call waiting shall be automatically connected when a channel becomes available. The amplified voice communication channel shall have automatic level control on return speech to assure a constant return speech level.

Capacity to call staff (classroom) stations having both telephones and loudspeakers, either by ringing the telephone or by a loudspeaker for two-way amplified voice communications. It shall be possible to program each staff location to be called either by speaker first or by ringing the telephone first. Only one station number to be used for the loud speaker and telephone. (Systems requiring a number for telephone and separate number for the speaker are not acceptable).
Ability to change the mode of communication during a call, i.e., change from amplified voice communications to phone-to-phone communications.

During the course of a call, the conversation may be continued over the telephone by lifting the telephone handset. The conversation shall automatically be switched from the speaker the handset.

Capability for any administrative telephone to transfer a "call" from another administrative telephone or any staff (classroom) telephone to any other telephone.

Facilities for conference calls between administrative telephones and between administrative telephones and staff (classroom) telephone or loudspeaker stations. Facilities for two-way communications between any staff (classroom) telephone and any classroom loudspeaker station.

Provide the capability of assigning speaker locations to any one or more of eight (8) software programmable zones for zone paging or time signal reception. Through programming, it shall be possible to exclude selected speakers from the reception of paging announcements.

Provisions for restricting access to the Emergency Announcements, paging or tone signal origination to certain administrative telephones. This shall be accomplished by the use of an authorized administrative telephone.

The system shall provide Personal Identification Numbers (PIN) for selected administrators. By dialing their PIN from any telephone, regardless of that phone's restrictions, they shall have all the capabilities of their office telephone.

If a telephone which is associated with a speaker originates a "paging announcement", the speaker shall automatically be muted to prevent feedback.

Facilities to easily change the dial code number of any circuit. The assignment of the architectural numbers shall be accomplished by the use of any authorized administrative telephone.

The system shall provide facilities for up to twelve (12) independent digital readout displays upon which incoming calls are identified by their designated numbers. The display shall show visually, in the order received, three (3) calls at a time. Emergency calls shall override normal calls and shall be identified as "EMER" and the station number.

Originating calls from any staff/classroom location may be directed to any or all of the twelve independent displays via programming from a designated administrative phone.

Provide a minimum of four (4) independent program memory sets. The choice of time of service change and active memory set selected shall be completely programmable. This feature shall allow selected stations to operate with different functions depending on the time of day.

The system shall be expandable up to 500 telephone and/or speaker circuits. Combining separate systems is not acceptable.

It shall be possible to review all calls stored, in groups of three in order received.

Facilities for answering calls registered in the readout merely by pressing a single "response" button.

Provide an All-Cancel function from an administrative telephone to cancel all classroom annunciated calls.

The system should have complete interconnect capabilities to central office lines. It shall be possible to transfer central office lines to any station in the system. Access to outside lines can be limited to certain authorized administrative telephones. Provide space for five CO modules.

Diagnostic functions shall be provided to simplify maintenance. An RS-232C serial data port shall be provided for connection to a computer for "on site" or via a modem for to a remote computer diagnostic functions by distributor or maintenance personnel. Provide modem with system.
The system shall provide standard classroom communication and emergency capabilities independent of the microprocessor equipment. Should the microprocessor fail, communication functions shall be accomplished from the main console. (No Exceptions)

The entire equipment cabinet with its electronics shall be factory wired and tested in the United States. (No Exceptions)

The system shall be equipped with one (1) telephone intercom channel, 32 communication links, (1) "manual" console intercom channel (capable of communicating with any classroom simultaneously with the telephone intercom channel), 1 program channel, 1 channel for zone functions, sufficient classroom speaker lines with twenty spare circuits and administrative lines as shown on the drawings. Furnish the quantity of administrative stations, administrative stations with digital readouts as indicated. Provide connection for customer’s telephone system.

Common corridor or area circuits of multiple speakers shall be limited to twelve speakers per circuit.

Exterior speaker circuits shall be limited to six speakers.

C. The Emergency Sound/Communications system shall provide at least the following features and functions:

Direct 2-way voice communications between the Control Center and any classroom or any other speaker-equipped location.

Adequate power (15 watts minimum) to over-ride high noise levels in such areas as shops, gymnasiums, natatoriums, bus loading points and playing fields.

Facilities for automatically sounding a warning tone signal (beep) over any loudspeakers selected for 2-way communications, to prevent unauthorized monitoring. The warning tone signal shall sound whenever the classroom is being monitored, and shall automatically repeat at regular intervals.

Selective distribution of program material to any or all classrooms.

Ability to transmit a program or announcement simultaneously to all classrooms and locations by the simple operation of a single color-coded All-Call pushbutton switch.

Built-in facilities for the following provided they have been described in other sections of this specification or indicated on plans:

Reception of AM and FM broadcasts from built-in tuner, and their distribution to any or all speakers.

Reproduction of recorded music and other program material from built-in CD player and its distribution to any or all speakers.

Distribution of programs originating at remotely located microphones with provisions for volume control at the remote location.

Pickup and broadcast of live programs from remote locations. Program selection shall be easily accomplished by simply pressing the appropriately labeled pushbutton.

Distribution of announcements from the Control Center microphone to any or all speakers.

Provisions for the instantaneous distribution from the Control Center of emergency messages to all locations equipped with loudspeakers, simply by pressing a single red pushbutton. This action shall bypass all other controls, over-ride all other programs, and transmit the emergency message at a preset volume level.

Input facilities for 2 low-impedance microphones and 3 auxiliary program sources.

Distribution of a tone-signal (pushbutton activated) to any or all classrooms as a pre-announcement alert signal or, for other signaling purposes.
Appendix   Fulton County Schools
Intercommunications Equipment  Design Requirements

Aural and visual monitoring facilities for each program channel.
Distribution of repeating chime signal (activated by master clock) through system.
Distribution of emergency, alert and clear signals through system (manually).
Facilities for emergency call switches in specified locations to originate an emergency call to the Control Center.

The system shall provide standard classroom communication and emergency capabilities independent of the microprocessor equipment. Should the microprocessor fail, communication functions shall be accomplished from the main console.

Provide interconnection from the fire alarm system to the communication system for alarm tones.
Color-keyed pushbuttons and colored guidelines shall be provided for each of the system's functions. The communications channel shall be identified by orange guidelines. The program channel shall be identified by green pushbuttons and guidelines on the Master Program panel

1.03 SUBMITTALS

A. Product Data: For the following:

Master stations.
Speaker-microphone stations.
Call-switch units.
All-call amplifier.
Intercommunication amplifier.
Paging amplifier.
Loudspeakers/speaker microphones.
All items listed under section 2, Products

B. Shop Drawings: Shall be prepared under supervision of a qualified Professional Engineer, and submitted to Architect for review.

Design Calculations: Calculate requirements for selecting seismic restraints for central control cabinets.
Equipment Details: Detail equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, and location of each field connection.
Master-Station Details: Scaled drawings for built-in equipment.
Wiring Diagrams: Power, signal, and control wiring. Include the following:

Identify terminals to facilitate installation, operation, and maintenance.
Single-line diagram showing interconnection of components.
Cabling diagram showing cable routing.

C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
D. Manufacturer Seismic Qualification Certification: Submit certification that central control cabinets, accessories, and components will withstand seismic forces defined in Division 26 Section "Electrical Supports and Seismic Restraints." Include the following:

Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Qualification Data: For Installer and testing agency.

F. Field quality-control test reports.

G. Factory Training: Provide factory certification for personnel

H. Service facilities: Available to owner/using agency of a duly authorized distributor of the equipment manufacturer, which shall stock the manufacturer’s standard parts.

I. Operation and Maintenance Data: For intercommunication equipment to include in emergency, operation, and maintenance manuals.

In addition to items specified in Division 1 Section "Operation and Maintenance Data," include a record of Owner's equipment-programming option decisions.

(3) copies as minimal.

Shall include internal schematics and wiring diagrams, detailed to allow a technician to install, operate, maintain, calibrate and repair equipment.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

Maintenance Proximity: Not more than 4 hours' normal travel time from Installer's place of business to Project site.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with NFPA 70.

E. Comply with UL 50.

1.05 COORDINATION

A. Coordinate layout and installation of ceiling-mounted speaker microphones with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PRODUCTS

1.06 MANUFACTURERS

A. Available Manufacturers: The equipment shall be Rauland equipment as furnished by SWC-Richardson Technology Systems who shall perform the warranty as herein specified.

1.07 EQUIPMENT CABINET

A. Rauland Model RP1103B equipment shall be contained in an upright rack of modern design, constructed of at least 16 gauge cold-rolled steel, heavily re-enforced for maximum strength and durability. It shall have a hinged and key-locking rear door providing authorized personnel with easy access to components. It shall be no more than 65 7/16" high, 22 3/8" wide, and 18 1/2" deep, with 61" total panel mounting space, designed for the installation of standard 19" professional equipment, finished in ebony black baked enamel. Provide two cabinets with three inch casters and frame for the cabinets.

1.08 CENTRAL CONTROL UNIT

A. Rauland Model TC4002 specifically designed for use with modern dual-tone telephones and switching networks. It shall provide two-wire balanced transmission complete with dial tone, automatic ringing and busy signal. It shall be of advanced microcomputer design, modular plug-in construction, non-volatile software, and user-programmable.

B. The TC4002 Central Control shall provide telephone circuits as shown on the drawings and thirty-two (32) links for thirty-two unrestricted simultaneous conversations. It shall be possible to expand the system up to 500 telephones and/or speaker lines without modification of the Central Control. A 12 watt voice-controlled amplifier shall be included to permit hands-free conversation with staff stations and provisions shall be available for additional voice-controlled amplifiers so that simultaneous multi-channel hands-free conversation may be accommodated. Provide one (1) amplifier.

C. It shall incorporate dual crystal-controlled receivers to provide maximum accessibility to the system with maximum reliability.

D. The TC4002 Central Control shall be available for mounting in a standard 19" rack and the overall dimensions shall not exceed 19" wide, 8.75" high, and 12" deep.

1.09 CONTROL PANEL

A. Rauland Model MCZ300, a complete program pre-amplifier providing a minimum of four (4) switchable microphone or program inputs, each selected by fluorescent color display pushbutton; a 15 watt communications amplifier with balanced 25V output, and separate incoming and outgoing level...
controls; full aural and visual monitoring facilities by a built-in monitor speaker and LED output level indicators; separate "All-Call" and "Emergency" facilities. Communications channel shall include a supervisory tone generator which shall sound a tone signal in any classroom being monitored for voice call origination from classrooms and shall include a "system-clear" tone signal when the call-in switch is activated. The Master Control Panel shall also include a pushbutton operated tone signal suitable for use as a pre-announcement alert signal, or for other signaling purpose, such as class change or to call custodial personnel. All Program channel fluorescent display pushbuttons and associated guidelines and instructions shall be Green; all Communications channel controls and guidelines shall be Orange.

1.10 AM/FM CD PLAYER
   A. RAULAND MODEL MCX325 shall be designed for continuous duty service in institutional and industrial sound systems. It shall be completely solid state, including transistors and integrated circuitry. The AM portion shall cover the entire broadcast range of 530 to 1620 KHz. The FM section shall have a tuning range of 85.5 – 108 MHz. Unit shall have a built-in front panel monitor speaker. Controls on instrument front panel shall include AM-FM button, on/off volume control, automatic search and manual tuning buttons, preset and store buttons, autos store button, clock button, tone control, balance control, fader control, fast-forward, fast-rewind, eject/reverse direction 4-position monitor/send switch. The unit shall have a back-lit digital readout display and indicate whether AM or FM, and shall indicate stereo status. It shall alternately display time. The system should also include a single disk CD player.

   B. The AM/FM Antenna shall be rack mounted at the console location.

1.11 POWER AMPLIFIER
   A. Shall be capable of delivering an audio output of 325 watts RMS per channel into 4 ohms or 650 watts into 8 ohms. Frequency response shall be plus/minus .5 dB, 20-20,000Hz. The amplifier shall operate continuously from 120VAC. The amplifier shall include fused outputs protective circuit to safeguard against damage from prolonged overloads and from extreme overloads, such as shorted output line. Controls shall be provided for level control. An LED pilot indicator shall be incorporated. The amplifier shall be capable of delivering full rated power to 25V or 70V constant voltage lines VIA a companion transformer. Provide (1)

1.12 ALARM SIGNAL CONTROL PANEL
   A. Rauland Model RX1027, shall provide for 3 separate alarm signals for quick pushbutton activation. It shall have 4 locking pushbuttons labeled "ALERT", "TAKE COVER", "CLEAR", and "OFF", mounted on charcoal gray panel. Operation of any of the alarm pushbuttons shall by-pass all other controls and automatically distribute the appropriate signal to all speakers at a pre-determined level. Switches shall be self-wiping with precious metal contacts. Dimension of panel, 19" wide, l 3/4" high, 2 3/4" deep.

1.13 ROOM SELECTOR PANEL
   A. Rauland Model SW25 shall contain 25 lever action 3-position four-pole selector switches of the positive detent type, designed for maximum reliability and a life expectancy of over 250,000 operations. Switch positions shall be legibly identified as Program "A", "Off" and Intercom "C". The Program "A" channel shall be identified by a Green guideline, Intercom channel "C" by Orange, and accordance with the "Follow the Color" operating method used in the Director Series System positions. Provide with multi-conductor cable with connectors on each end and split terminal blocks with connectors and bridging clips. Furnish selector panels, cables and terminal blocks for individual circuits and a minimum of 20 spares.

1.14 SPEAKER CONTROL
Appendix Fulton County Schools
Intercommunications Equipment Design Requirements

A. Rauland Model TC4110 shall easily mount to the rear of its associated selector switch panel. It shall contain 26 24-volt DC DPDT relays. Each relay shall be hermetically sealed to prevent contamination and shall have a life expectancy of 1,000,000 operations. Relays shall have precious metal contacts for minimum contact resistance, and shall carry at least a 1 amp rating. "Normally open" contacts and remaining side of each relay are permanently "bussed" together and then terminated. The time zone panel shall be a printed circuit board of G-10 epoxy. Furnish with selector panels.

1.15 MICROPHONE

A. Rauland Model 1295, omnidirectional dynamic, desk type public address or paging type with base constructed of die-cast zinc alloy with durable molded cycolac body in matching black. Dynamic moving coil incorporates a special diaphragm of mylar, resulting in excellent sensitivity and smooth wide-range peak-free response of 50-12,000 Hz. Shall have press-to-talk and lock-to-talk switching, complete with 7' cord, concealed Hi-Lo switch, non-skid molded feet. Height 9 3/8", width 4 3/4", depth 5 7/8".

1.16 SPEAKERS

A. Rauland Model USO188, shall be an 8" permanent magnet cone type having viscous-damped cone and a ceramic (Indox 5) magnet weighing 5 oz. It shall have a frequency response of at least 55-18,000 Hz, a 10 watt program power-handling capacity and an axial spl of at least 97.6 db. Voice coil shall be 3/4" diameter with 8 ohm impedance. The speaker shall be equipped with Model TML25 multi-tap transformer 1/2, 1, 2 and 4 watts, 25V. (Lowell equal)

B. FLUSH CEILING GRILLE

Speaker ceiling grille shall be Rauland ACC1000 constructed of steel and have a white baked epoxy finish. It shall include matched hardware for mounting a standard 8" speaker. Its overall diameter shall be 12 7/8" with center perforation of 7 5/8". (Lowell WB8 equal)

C. CEILING SPEAKER BACKBOX

Model ACC1101 shall be a round one-piece backbox for flush mounting a standard 8 inch speaker. The enclosure shall be of painted, one-piece 22 gauge drawn steel and shall have applied in its interior a fire retardant resonance damping material. It shall have four perforated steel mounting brackets and four knockouts for conduit. Dimensions, 9 3/4" diameter with flange diameter of 12 2/16", mounting centers 11 1/4", depth 4 1/16". (Lowell 8XD4 equal)

D. SPEAKER SUPPORT BRIDGE

Rauland Model ACC1104 shall be a single piece unit constructed of 24 gauge galvanized rust-resistant cold rolled steel, 23 3/4" long and 14 1/2" wide. The unit is designed for firm support of ceiling speaker, grille, and backbox. (Lowell LBS8R equal)

E. FLUSH WALL SPEAKER BAFFLE

Rauland Model ACC1003 constructed of heavy gauge CRS and shall have a white epoxy finish. It shall have a square grille opening with a separate subplate for mounting speaker baffle to the ACC1105 backbox. Its dimensions are 11 1/2" square by 3/16". (Lowell equal)

F. SURFACE MOUNTED BAFFLE

Rauland Model ACC1004 constructed of heavy gauge CRS and shall have a white epoxy finish. It shall have a square grille opening with a separate subplate for mounting speaker baffle to the ACC1102 surface backbox. The backbox shall be 12 1/2" square by 4" deep with white epoxy finish. (Lowell equal)

G. TAMPERPROOF SPEAKER GRILLE
Rauland Model ACC1008 vandal proof baffle is designed for mounting a standard 8 inch speaker. It shall be constructed of a special self-aging aluminum alloy with tensile strength of 44,000 psi and shall be backed up with a heavy gauge cold rolled steel perforated screen to protect speaker. Each unit shall include tamperproof hardware to prevent entry into interior. It shall be finished in textured white baked enamel and have overall dimensions of 10 3/4" square by 3/4" projection. Provide MISCO #FC8WP weatherproof speaker and ACC1108 back box. Provide for Exterior Areas. (Lowell SGVP/8C10MR/TLM25 equal)

H. CEILING SPEAKER ASSEMBLY – The ceiling speaker assembly shall be a Rauland BAFKIT1X2S Lay-In Tile Speaker. The speaker shall be an 8-inch speaker with a 25 volt transformer. The speaker shall be rated at 8 Watts RMS and have a Frequency Response of 65 to 17Khz. The speaker baffle shall have dimensions of 23 ¾“ Width, 11 ¾“ Length and 3 3/8” Depth. The total weight of the speaker shall be 4 lbs. 14 oz. Refer to the plans for quantities and locations of speakers. (Lowell Equal)

1.17 SPEAKER/CALL STATION
A. Rauland Model HSS1 shall interface with the Rauland Telecenter and Director series systems. Two-way communications shall be accomplished by the built-in speaker-microphone. A call-in momentary pushbutton switch shall be provided. The complete unit shall be vandal-proof in design and construction, protected externally by an 11 gauge stainless steel plate with brushed finish. Actuator shall be flush with face plate and completely isolated from the push-button, and movement shall be coupled through a coil spring to prevent damage. Speaker-microphone shall be protected against tampering as well as by flame or liquids. Unit shall mount in a standard three-gang electrical box. Surface mount requires ACC1119 box.

1.18 CALL STATION
A. Rauland Model 2305CS, call origination switch shall be mounted on a stainless steel plate and require one momentary depressing of the button to activate a "call in". Provide additional "Emergency" call button where indicated.

1.19 VOLUME CONTROLS
A. Provide volume controls where indicated. These controls shall not have an off position.

1.20 ADMINISTRATIVE MASTER
A. Rauland Model TC6204 shall be a desk type high quality touch dial telephone, dual-tone instrument suitable for desk use or wall mounting, complete with call buzzer, 5 1/2’ retractable cord with plug. It shall conform to public utility specifications. The dial shall be a standard 12 pushbutton type with solid-state pretuned oscillators. The instrument housing and handset shall be of high impact plastic, finished in gray color. Furnish desk or wall type stations as required.

1.21 LCD DESK DISPLAY
A. Rauland Model TC4221TG shall display up to four three digit station numbers simultaneously; the first three shall be registered calls and the forth shall indicate the last number called. An audible tone shall be provided and the display shall be equipped with a dip switch for selecting its own addressable code to allow routing calls to it independently of other displays. Provide where indicated.

1.22 MASTER CONTROL CLOCK
A. Rauland 2524 ChronoCom Master Control Clock System shall be microprocessor-based, and shall be easily programmable by the user through electronic means. A simple step-by-step guide shall be provided to enable the user to accomplish the programming quickly and correctly. Master control
clocks which are not microprocessor-based and/or which require a technician or programmer to perform the initial and subsequent changes in program, at additional cost, shall not be considered.

B. This Program Clock shall be mounted in, and connected to the Intercom Console.

C. FUNCTIONS A:
   Ability to operate solely as a master clock
   Capacity of storing 350 events and up to 100 holidays in non-volatile memory
   Ability to review, edit and delete events
   Review events from any time of day
   Events shall be programmable to any one or all of eight zones
   Selection of any one of eight schedules
   Fully automatic holiday scheduling
   User programmable Automatic Daylight Savings Time

1.23 SECONDARY CLOCKS
A. RAULAND MODEL 2500 SERIES – The Secondary Clock shall operate from 24vac, controlled from the Master Clock at the Central Cabinet. Furnish single dial digital and double dial digital clocks as shown on drawings. Furnish a clear heavy duty guard for the gymnasium. Single dial clocks shall be flush mounted. Double dial clocks shall be wall mounted. The display shall be 4 character; seven segment red LEDs 2.5” high. The clock shall measure 12” in length, 2.9” deep and 6” high.

B. A 24 VAC power supply shall be provided with solid state buffers for the clock circuits.

1.24 UPS/LINE CONDITIONER
A. Model UP-51500

1.25 LIGHTNING PROTECTION
A. DITEK lightning protectors shall be provide for any copper cables that are installed between buildings.

1.26 CABLE
A. Conductors: Jacketed, twisted pair and twisted multipair, untinned solid copper. Sizes as recommended by system manufacturer, but not smaller than No. 22 AWG.
B. Insulation: Thermoplastic, not less than 1/32 inch thick.
C. Shielding: For speaker-microphone leads and elsewhere where recommended by manufacturer; No. 34 AWG tinned, soft-copper strands formed into a braid or equivalent foil.
   Minimum Shielding Coverage on Conductors: 60 percent.
D. Plenum Cable: Listed and labeled for plenum installation.
E. Classroom Cable
   West Penn 25357BBLUE
F. Cable to Speaker from Call Station
   West Penn 25291BBLUE
G. Cable for Administrative Stations
EXECUTION

1.27 INSTALLATION

A. Wiring Method: Install wiring in raceways except within consoles, desks, and counters. Conceal cables and raceways except in unfinished spaces.

B. Wiring Method: Install wiring in raceways except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum-board partitions where cable wiring method may be used. Use plenum cable in environmental air spaces, including plenum ceilings. Conceal cables and raceways except in unfinished spaces. Conceal cables in raceway sleeves through wall partitions from corridors to rooms.

C. Install exposed cables parallel and perpendicular to surfaces or exposed structural members, and follow surface contours. Secure and support cables by straps, staples, or similar fittings designed and installed to avoid damage to cables. Secure cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, or fittings.

D. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess. Use lacing bars in cabinets.

E. Control-Circuit Wiring: Install number and size of conductors as recommended by system manufacturer for control functions indicated.

F. Separation of Wires: Separate speaker-microphone, line-level, speaker-level, and power wiring runs. Install in separate raceways or, where exposed or in same enclosure, separate conductors at least 12 inches for speaker microphones and adjacent parallel power and telephone wiring. Separate other intercommunication equipment conductors as recommended by equipment manufacturer.

G. Splices, Taps, and Terminations: Arrange on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

H. Match input and output impedances and signal levels at signal interfaces. Provide matching networks where required.

I. Identification of Conductors and Cables: Color-code conductors and apply wire and cable marking tape to designate wires and cables so they identify media in coordination with system wiring diagrams.

J. Weatherproof Equipment: For units that are mounted outdoors, in damp locations, or where exposed to weather, install consistent with requirements of weatherproof rating.

K. Connect wiring according to Division 26 Section "Conductors and Cables."

1.28 GROUNDING

A. Ground cable shields and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

B. Signal Ground Terminal: Locate at main equipment cabinet. Isolate from power system and equipment grounding.

C. Install grounding electrodes as specified in Division 26 Section "Grounding and Bonding."
1.29 SYSTEM PROGRAMMING

A. Programming: Fully brief Owner on available programming options. Record Owner's decisions and set up initial system program. Prepare a written record of decisions, implementation methodology, and final results.

1.30 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

C. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

D. Perform the following field tests and inspections and prepare test reports:
   • Schedule tests with at least seven days' advance notice of test performance.
   • After installing intercommunication equipment and after electrical circuitry has been energized, test for compliance with requirements.
   • Revise test requirements in subparagraphs below if all-call or paging is not specified.
   • Operational Test: Test originating station-to-station, all-call, and page messages at each intercommunication station. Verify proper routing and volume levels and that system is free of noise and distortion. Test each available message path from each station on system.
   • Check each speaker line for correct impedance: the load shall not be larger than the amplifier output.
   • Tap each speaker for proper volume in area to be served. The system supplier's authorized representative shall be on hand for final hook-up and test, and shall certify, in writing, that the system is fully operational and meets the requirements of this section.
   • Signal Ground Test: Measure and report ground resistance at system signal ground. Comply with testing requirements in Division 26 Section "Grounding and Bonding."

E. Retesting: Correct deficiencies and retest. Prepare a written record of tests.

F. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified. Prepare a list of final tap settings of paging speaker-line matching transformers.

G. Prepare written test reports.
   Include a record of final speaker-line matching transformer-tap settings, and signal ground-resistance measurement certified by Installer.

1.31 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service and initial system programming.

B. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements.

C. Complete installation and startup checks according to manufacturer's written instructions.
D. Richardson Associates shall provide a one year warranty on parts and labor. An additional four year warranty shall be provided on parts by Richardson Associates and the Rauland Corporation. The systems shall be demonstrated to the proper authorities and a letter of certification from the authorized supplier stating that the systems are operating as herein specified shall be forwarded to the Architect.

1.32 ADJUSTING

A. On-Site Assistance: Engage a factory-authorized service representative to provide on-site assistance in adjusting sound levels, resetting transformer taps, and adjusting controls to meet occupancy conditions.

B. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site outside normal occupancy hours for this purpose, without additional cost.

1.33 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner’s maintenance personnel to adjust, operate, and maintain intercommunication equipment. Refer to Division 1 Section "Demonstration and Training."

Train Owner’s maintenance personnel on programming equipment for starting up and shutting down, troubleshooting, servicing, and maintaining equipment.
SECURITY SURVEILLANCE SYSTEMS

SCOPE OF WORK
The scope of work covers installation of a turnkey IP Network Based Video Surveillance Systems for security monitoring purposes, to include all labor, materials, equipment, testing and training for a fully operational system on newly constructed FCS facilities, and upgrades at existing FCS facilities. Upgrades include installation of required equipment to upgrade existing black and white analog systems to color IP Network based systems and/or upgrade existing color systems from analog to IP/Network Based Systems. Systems as mentioned above shall include:

IP Cameras, CAT 6 cabling, network video recorders, video servers, video workstations, video management system application software (server and client based); monitoring devices; power supply; surge protection; camera mounting devices; and installation as specified by manufacturer.

All network patch panels, PoE network switches, available rack mounting space in existing FCS network racks and network connectivity shall be provided by Fulton County Schools IT Support Department. Coordination shall be required with the, Fulton County Schools Technical Support Specialist (at 404 538-1479) a minimum of one (1) week prior to attempting to install any software, connecting any equipment to the existing Fulton County School network or attempting to install any equipment in the existing IT Equipment Racks.

The Installer shall be fully responsible for the installation of the equipment and will guarantee that it meets specifications. Any items that do not meet the specifications and drawings outlined herein shall be corrected immediately by the contractor at no additional cost to the Owner.

Two (2) complete sets of as-built drawings and bound O & M Manuals as well as two (2) copies of a Statement of Warranty and Letter of Acceptance shall be furnished to the Owner upon completion of the work and final acceptance.

PROGRAMMING
All IP/Network Based Video Surveillance Systems shall be programmed to archive video as follows:
1. During normal operation, the IP Based Security Surveillance System shall be programmed to record all cameras continuously at a frame rate of 1 frame per second for 45 days and at a minimum of HD resolution with storage calculated on 40% motion. Retention shall be established based on “FIRST IN – FIRST OUT” functionality.
2. When motion is detected at any single camera or at multiple cameras, the IP Based Security Surveillance System shall be programmed to record the single camera or all cameras (with motion in the field of view), at 15 frames per second and at the full resolution of the camera(s) during the event. All cameras shall be programmed with a minimum of two (2) motion grids and cameras viewing corridors shall be programmed with a minimum of three (3) motion grids.
3. This level of programming has been difficult for most contractors. Obtaining Manufacturer’s on-site/phone support and all associated cost are the full responsibility of the contractor. All programming must be completed prior to Final Inspection.

Some schools will require electrical power outlets for security systems. This service will be provided by FCS.

The quantity of Interior/Exterior IP/Network Cameras and LCD flat panel, color display monitors for each project is as follows:

New Elementary Schools – Shall be installed with a minimum twenty four (24) IP/Network Cameras: These buildings will have Interior Cameras and Exterior Cameras as marked on drawings provided by FCS upon generation of a work order for installation. All cameras shall be routed to the closest IDF/MDF Rooms and connected to the Fulton County School network. A maximum of four (4) Video Management System client software applications shall be provided and loaded onto OWNER PROVIDED workstations (typically loaded...
onto the Principal’s, Assistant Principals, and Resource Officer’s – if assigned to school laptop or notebook computers). Pricing for an ADD ALTERNATE is to be provided for one additional 42” (or larger – not to exceed 50”) flat panel display monitor and workstations, to be installed either in the Principal’s Office or another preferred monitoring location.

Existing Elementary Schools – Existing schools with analog cameras, digital video recorders and black/white or color cameras will be upgraded based on available funding. These schools shall be upgrade to new IP/Network Based technology. Also, the camera count shall be a minimum twenty four (24) IP/Network cameras. These buildings will have Interior Cameras and Exterior Cameras as marked on drawings provided by FCS upon generation of a work order for installation. All cameras shall be routed to the closest IDF/MDF Rooms and connected to the Fulton County School network. A maximum of four (4) Video Management System client software applications shall be provided and loaded onto OWNER PROVIDED workstations typically loaded onto the Principal’s, Assistant Principals, and Resource Officer’s – if assigned to school laptop or notebook computers). Four (4) additional 42” (or larger – not to exceed 50”) flat panel display monitors with wall mounts and two (2) workstations shall be installed in the Resource Officer’s Office for full time viewing and monitoring of the IP/Network Based Video Surveillance System.

New Middle Schools – Shall be installed with a minimum forty eight (48) IP/Network Cameras: These buildings will have Interior Cameras and Exterior Cameras as marked on drawings provided by FCS upon generation of a work order for installation. All cameras shall be routed to the closest IDF/MDF Rooms and connected to the Fulton County School network. A maximum of four (4) Video Management System client software applications shall be provided and loaded onto OWNER PROVIDED workstations typically loaded onto the Principal’s, Assistant Principals, and Resource Officer’s laptop or notebook computers). Four (4) additional 42” (or larger – not to exceed 50”) flat panel display monitors with wall mounts and two (2) workstations shall be installed in the Resource Officer’s Office for full time viewing and monitoring of the IP/Network Based Video Surveillance System.

Existing Middle Schools – Existing schools with analog cameras, digital video recorders and black/white or color cameras will be upgraded based on available funding. These schools shall be upgrade to new IP/Network Based technology. Also, the camera count shall be a minimum forty eight (48) IP/Network cameras. These buildings will have Interior Cameras and Exterior Cameras as marked on drawings provided by FCS upon generation of a work order for installation. All cameras shall be routed to the closest IDF/MDF Rooms and connected to the Fulton County School network. A maximum of four (4) Video Management System client software applications shall be provided and loaded onto OWNER PROVIDED workstations typically loaded onto the Principal’s, Assistant Principals, and Resource Officer’s – if assigned to school laptop or notebook computers). Four (4) additional 42” (or larger – not to exceed 50”) flat panel display monitors with wall mounts and two (2) workstations shall be installed in the Resource Officer’s Office for full time viewing and monitoring of the IP/Network Based Video Surveillance System.

New High Schools – Shall be installed with a minimum sixty (60) IP/Network Cameras: These buildings will have Interior Cameras and Exterior Cameras as marked on drawings provided by FCS upon generation of a work order for installation. All cameras shall be routed to the closest IDF/MDF Rooms and connected to the Fulton County School network. A maximum of four (4) Video Management System client software applications shall be provided and loaded onto OWNER PROVIDED workstations typically loaded onto the Principal’s, Assistant Principals, and Resource Officer’s laptop or notebook computers). Four (4) additional 42” (or larger – not to exceed 50”) flat panel display monitors with wall mounts and two (2) workstations shall be installed in the Resource Officer’s Office for full time viewing and monitoring of the IP/Network Based Video Surveillance System.

Existing High Schools – Existing schools with analog cameras, digital video recorders and black/white or color cameras will be upgraded based on available funding. These schools shall be upgrade to new IP/Network Based technology. Also, the camera count shall be a minimum sixty (60) IP/Network cameras. These buildings will have Interior Cameras and Exterior Cameras as marked on drawings provided by FCS upon generation of a work order for installation. All cameras shall be routed to the closest IDF/MDF Rooms and connected to the Fulton County School network. A maximum of four (4) Video Management System client software applications shall be provided and loaded onto OWNER PROVIDED workstations typically loaded onto the Principal’s, Assistant Principals, and Resource Officer’s laptop or notebook computers). Four (4) additional 42” (or larger – not to exceed 50”) flat panel display monitors with wall mounts and two (2) workstations shall be installed in the Resource Officer’s Office for full time viewing and monitoring of the IP/Network Based Video Surveillance System.
Fulton County School network. A maximum of four (4) Video Management System client software applications shall be provided and loaded onto OWNER PROVIDED workstations (typically loaded onto the Principal’s, Assistant Principals, and Resource Officer’s – if assigned to school laptop or notebook computers). Four (4) additional 42” (or larger – not to exceed 50”) flat panel display monitors with wall mounts and two (2) workstations shall be installed in the Resource Officer’s Office for full time viewing and monitoring of the IP/Network Based Video Surveillance System.

INSTALLATION
The contractor shall furnish and install all conduit and equipment in accordance with applicable local, state and national codes, manufacturers’ recommendations and FCS specifications. Contractor shall provide the owner with all personnel performing work and proceed when approval is received from Fulton County Police Security. Fulton County Schools Police will perform background checks on all proposed installation personnel. It is preferred that installers be Avigilon and AXIS certified.

No exposed wiring below ceiling, across walkways or outside building will be accepted.

All penetrations through Fire Rated barriers will be Fire stopped with approved “Fire Stop.”

All camera housings and support brackets shall be securely attached to mounting surfaces. Use lead shields on solid masonry, wood screws on wood and machine bolts on structural steel. All anchoring devices shall be rated to support not less than five times the rated load.

All cable, routed between camera locations and the closest IDF/MDF Rooms shall be CAT 6 data grade cable colored PINK. This cable must be installed to the current FCS NETWORK CABLE Standards. Coordinate with Willie Beal, Fulton County Schools - Technical Support Specialist (at 404 538-1479) to obtain the most current standards.

TESTING ACCEPTANCE
All aspects of the surveillance system shall be tested by the contractor in the presence of the project manager representing the Owner and shall include, but not be limited to the following:
1) Verification of all specified camera locations
2) Owner acceptable field of view for each camera
3) Owner acceptable focus and backlighting adjustments
4) Verification of correct cable type and color
5) Verification of required set up and configuration of each IP Camera
6) Verify cable is routed to the correct IDF/MDF and that cameras have the correct assignment of IP addresses
4) Verification of camera numbering with head end and as-built records

CLEAN-UP
Contractor shall maintain all work areas in a clean and orderly manner. At the end of each work day, the contractor is to remove all trash and debris from work areas and place it in the facility common trash collection bins. All installations requiring modifications to walls, ceilings or floors are to be inspected and repaired as needed. All surfaces worked on are to be repaired to match surrounding surface.

IN-SERVICE
Two (2) complete sets of as-built drawings and bound O & M Manuals as well as two (2) copies of a Statement of Warranty and Letter of Acceptance shall be furnished to the Owner upon completion of the work and final acceptance.

Provide one (1) 2-hour on-site training session on the configuration and operation of the system for the Owner representatives including but not limited to Principal, Assistant Principal, Resource Office Security personnel and Maintenance staff office personnel. A hands-on demonstration of the operation of all system components including program, changes and functions shall be included.
SITE VISIT SCHEDULE
Site visits will be arranged as deemed necessary.

EQUIPMENT SPECIFICATIONS
Listed Brand Names Only, No Substitutes are allowed.

SECURITY SURVEILLANCE CAMERAS:
1. The security contractor shall be required to be a Certified Installer of AXIS cameras or a Certified Business Partner with AXIS. Security contractors may become a Certified Installer by receiving a minimum of eight (8) hours training on the programming and setup of AXIS cameras prior to the award of the project or during project start-up.
2. All cameras shall be U.L. listed and shall be the standard product of one manufacturer complying with not least than the specifications contained herein. Installation of each camera shall include mounting brackets and/or camera housings fully compatible with the camera provided and as required by IP Based Security Surveillance System camera schedule.
3. Low light Indoor Day/Night Fixed, 1.3 Megapixel Cameras:
   a. The camera shall be the Axis P3354-V vandal resistant, high security dome style camera.
4. Indoor Fixed Mini-Dome, Corridor Format, 2 Megapixel Cameras:
   a. The camera shall be the Axis M3005-V vandal resistant dome style camera.
5. Indoor Fixed Dome, Wide Dynamic Range, 3 Megapixel Cameras:
   a. The camera shall be the Axis P3365-VE vandal resistant, high security dome style camera.
6. Indoor Fixed Dome, Corridor Format, 2 Megapixel Cameras:
   a. The camera shall be the Axis P3214-V vandal resistant, high security dome style camera.
7. Outdoor Pan-Tilt-Zoom Cameras (utilized unless pendant or pole mounting is required):
   a. The camera shall be the Axis P5414 vandal resistant, high security dome style camera.
8. Indoor/Outdoor Pan-Tilt-Zoom Cameras (utilized when pendant or pole mounting is required):
   a. The camera shall be the Axis Q6044-E high security dome style camera. When utilized in the Gymnasium or the Cafeteria and ceiling mounted on a pendant in the center of the space, the Q6000-E accessory shall be added (adds four, 2 megapixel cameras) for a full 360 degree view of the space.
9. All interior fixed, dome style cameras, installed in lay-in tile ceilings shall be supported by T-bar Support Kits.
10. All interior pan/tilt/ zoom, flush mounted dome style cameras installed in lay-in tile ceilings, shall be supported by straps secure to the structure above accessible ceiling.

FLAT PANEL SECURITY SURVEILLANCE COLOR MONITORS:
1. Monitors shall be wall mounted and provided with an articulating wall mount.
2. The wall mount color monitors shall be a 42” (or larger – not to exceed 50’’), TFT-LCD monitors which delivers a 700:1 contrast ratio, 0.294mm pixel pitch, 1280 x 1024 maximum resolution, and horizontal/vertical viewing angle of 170/170 degrees. Monitors shall be “slim design” type and include power brick.
3. Acceptable manufacturers shall include Samsung, NEC, Panasonic and Sony Monitors must be rated for 24/7 use.

VIDEO MANAGEMENT SYSTEM (VMS):
1. The Video Management System (VMS) approved for this project is Avigilon. No other VMS shall be considered and no substitutions will be allowed.
2. The security contractor shall provide the latest version of Avigilon VMS.
3. The Video Management System shall be licensed for a total number of cameras plus additional number of licenses as specified by the contract documents.

POE NETWORK SWITCHES
1. Connectivity to standard PoE Network switches shall be provided by Fulton County Schools.
2. The PoE Network Switch model numbers shall be the Brocade ICX 6610 POE or the Avaya 4548 POE.
3. Additional PoE power must be provided and installed by the security contractor for any cameras (interior or exterior) that have power requirements exceeding PoE IEEE802.3af standards or at exterior camera locations that incorporate heaters, blowers and P/T/Z function.

MASTER NTP CLOCK SERVER
1. Fulton County Schools (FCS) shall provide connectivity to a master clock server across the existing network.

APPLICATION AND STORAGE SERVERS
1. The security contractor shall provide the required Avigilon network video server and network storage with the necessary expansion.
   a. The security contractor shall provide the Avigilon HD – NVR2 Series Network Video Recorder Server and shall be responsible for sizing the server according to the number of cameras to be installed as well as future camera locations as noted by the camera schedule incorporated in the construction drawings.
   b. The security contractor shall provide the Avigilon HD – NVR2 - EXP2 Series Network Video Storage Expansion. The storage expansion shall be sized according to the number of cameras to be installed and the storage requirements stated below as well as future camera locations as noted by the CAMERA SCHEDULE incorporated in the Construction Drawings.

NETWORK SWITCHES AND PATCH PANELS
1. The security contractor shall be responsible for surveying and reviewing the network resources (such as patch panels, switches, routers, etc.) being provided by Fulton County Schools prior to any attempts to connect IP cameras to the existing network. Should any deficiencies be found, Fulton County Schools must be made aware and given an opportunity to address the deficiencies.

WORK STATIONS
1. The following are minimum requirements for the display monitor workstations:
   a. The minimum configuration for all workstations utilized to drive video display monitors in the Principal’s Office, shall be Dell OptiPlex 990 with Core i7-2600 3.4 GHz processor, 8M, VT-x OptiPlex 8GB Non-ECC 1333 MHz DDR3, 2x4GB, 250 GB SATA 6.0 Gb/s and 8MB Data Burst Cache, Windows 7 Ultimate 64 bit, Logitech wireless unified keyboard and mouse, 16X DVD+/RW SATA Data Only, Gaming Video Card with 2 Gb memory and two (2) video outputs, Cyberlink Power DVD 9.5, OptiPlex 990 Minitower Power Supply with Heat Sink, Dell Support and Hardware Warranty.
   b. Acceptable models are the Dell OptiPlex 990 series.

TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)
1. At all exterior camera locations, copper cables and conductors which serve as 120V power, control, or video conductors shall have surge protection circuits installed at each end (at device locations and where connections are made to network equipment). Fuses shall not be used for surge protection.
2. Acceptable Manufacturers: Northern Technologies, Inc., EDCO. Product shall be warranted against defect for a period of not less than five (5) years.
3. Grounding: Provide a dedicated, separate No. 6 AWG copper conductor from building grounding system to the security equipment room, security equipment cabinets, and central control room. Connect all lightning protection devices and security equipment non-current carrying metal parts to grounding conductor in accordance with Article 250 of the National Electric Code. Provide ground bus bar in equipment room and control room with dedicated ground conductor to each cabinet, enclosure, pull/junction box and all equipment.
TYPICAL CLASSROOM TEACHING WALL

Below is an example of the typical classroom teaching wall configuration.

**Update Notes 1/6/2015:**
- DVD player bracket no longer required
- However, an electrical rough-in still required for control panel
- Current standard FCS projector is Epson Brightlink 595wi.

**NOTES**

1. PROJECTOR BRACKET WILL BE INSTALLED BY OWNER 7” ABOVE TOP OF THE MARKERBOARD. INSTALL 3/4” FIRE RATED WOOD BLOCKING TO SPAN BETWEEN STUDS IN ALL GYP BOARD PARTITIONS AS INDICATED ON ELEVATION. PROVIDE A 1/2” CAMPER ON ALL EDGES.

2. STUB OUT CONDUITS FOR PROJECTOR, DVD AND USER INTERFACE ABOVE CEILING AS SHOWN. CONDUITS SHALL HAVE LONG SWEEP ELBOWS, PLASTIC BUSHINGS ON BOTH ENDS, PULL STRING, AND BLANK STAINLESS STEEL COVERS.

3. PROJECTOR SHALL BE CENTERED OVER THE MARKERBOARD AND WILL PROJECT DIRECTLY ONTO THE WHITE BOARD. THIS MAY NOT NECESSARILY BE THE CENTER OF THE CLASSROOM.

4. COORDINATE ELECTRICAL ROUGH IN WITH MARKERBOARD LOCATION. NO OUTLETS WILL BE ALLOWED IN CEILING TILES.
KITCHEN DESIGN GUIDELINES

The following pages illustrate preferred layouts for the major areas of the kitchens. Separate diagrams have been prepared for elementary, middle, and high schools.

NOTES:

- Contact Fulton County Schools for current list of kitchen equipment
- Layouts provided are meant to illustrate required equipment and optimal adjacencies for new construction. Renovations may require deviation from these guidelines
- Kitchen hood shall be a double shell design consisting of an inner exhaust canopy with minimum 86% supply air ratio, constructed of heavy gauge stainless steel exterior
- Walk-in freezer and cooler units shall have digital temp controls and ECM
- Walk-in freezer and cooler should have separate entrance doors, accessed directly from the kitchen
- Controls shall be Johnson Controls A419
- Outside units shall have scroll compressor with ECM condenser fan motor
- Tilt skillet must have drain trough in front of it
- Twelve gallon skillets must have drain trough in front of it or be plumbed to a floor drain
- Teachers’ dining ice machine shall be separate from the ice machine in the kitchen due to health regulations.
- At high schools, there should be no more than 6” of counter depth on the serving side of the hot food units in order to allow kitchen staff to access the wells
- All doors into and inside of kitchen should be lockable with one key that is not the master key
- Doors between kitchen and cafeteria and along passthru wall should be metal with lites. Door into laundry area needs a lite.

Submit all kitchen designs to FCS Executive Director of Nutrition for review and approval prior to finalization
Notes:
- Ice maker in teacher dining to be included in scope
- Install heat-safe epoxy under hood
- Washer and dryer and ice cream boxes to be included in scope
- All hot food units to have heat lamps
- Paper tray dispenser and hard tray dispenser to be provided
- Cooler size requirements may be impacted by grant initiatives
Notes:
2 Milk Cooler
4 Cold Food Counter
5 Hot Food Unit
8 Tray Dispenser
9 Pass-Thru Refrigerator
10 Pass-Thru Heated Cabinet
11 Ice Cream Cabinet
12 Cashier Stand
13 Cashier Stand Extended
28 Hose Reel
69 Ice Maker with Bin
79 Work Table
95 Floor Sink
96 Refrigerated Display
97 Paper Tray Dispenser
Notes:
30 Utility Distribution System
31 12 Gallon Kettle with Stand
32 Tilt Skillet
34 Convection Steamer
40 Combi Oven
42 Convection Oven
90 Exhaust Hood
94 Floor Trough
95 Floor Sink
Electrical Outlet
Electrical Outlet Above Desktop
Phone and Data Outlet
Data Outlet
Speaker for Phone

Safe in closet is preferred
Access to office from kitchen
Window to provide visual access to kitchen
Shelf above desk

Alternate safe location under counter; position away from sight line of door

Notes:
74 Desk
75 Safe
76 Closet

Fulton County Schools Design Requirements
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Updated February 27, 2015
Notes:
8 Tray Dispenser  
28 Hose Reel  
56 Hand Sink  
62 Mobile Pot Rack  
66 Pot and Pan Sink  
67 Wall Mounted Pot Rack  
77 Mobile Bun Pan Rack  
80 Silverware Sink  
81 Soiled Dish Table  
82 Scrap Collector  
83 Dishwasher  
84 Pre-Rinse Faucet  
86 Side Loader  
87 Clean Dish Table  
88 Unloader  
94 Floor Trough
Notes:
Ice maker in teacher dining to be included in scope
Install heat-safe epoxy under hood
Washer and dryer and ice cream boxes to be included in scope
All hot food units to have heat lamps
Paper tray dispenser and hard tray dispenser to be provided
Cooler size requirements may be impacted by grant initiatives
Notes:
2 Milk Cooler
6 Hot Food Unit
8 Tray Dispenser
9 Pass Thru Refrigerator
10 Pass Thru Heated Cabinet
11 Ice Cream Box
12 Cashier Stand
14 Frost Top
15 Flat Top
19 Silver/Napkin Dispenser
28 Hose Reel
56 Hand Sink
69 Ice Maker with Bin
96 Refrigerated Display
97 Paper Tray Dispenser

Sneeze guard to allow self-service at Grab & Go
Provide option to convert some hot wells to flat top space
Notes:
30 U.D.S.
31 12 Gal. Kettle w/ Stand
32 40 Gal. Tilt Skillet
34 Convection Steamer
35 Conveyor Oven/Impinger
37 Cook and Hold Oven
40 Combi Oven
42 Convection Oven
90 Exhaust Hood
94 Floor Grate
95 Floor Sink
Middle School Kitchen
Manager's Office

Access to office from kitchen

Windows to provide visual access to kitchen

Shelf above desk

Safe under counter if no closet; position away from sight line of door

Notes:
74 Desk
75 Safe

Electrical Outlet

36" Electrical Outlet Above Desktop

Phone and Data Outlet

Data Outlet

Speaker for Phone
Notes:
8 Tray Dispenser
28 Hose Reel
56 Hand Sink
66 Pot and Pan Sink
67 Wall Mounted Pot Rack
77 Mobile Pot Rack
80 Portable Silver Soak Sink
81 Soiled Dish Table
82 Scrap Collector
83 Dishwasher
86 Side Loader
87 Clean Dish Table
88 Unloader
94 Floor Trough
Notes:
- Ice maker in teacher dining to be included in scope
- Install heat-safe epoxy under hood
- Washer and dryer and ice cream boxes to be included in scope
- One of five serving lines to be “Grab & Go” configuration
- All hot food units to have heat lamps
- Paper tray dispenser and hard tray dispenser to be provided
- Cooler size requirements may be impacted by grant initiatives
Notes:
6 Hot Food Unit
7 Hot Plate
8 Tray Dispenser
9 Pass Through Refrigerator
10 Pass Thru Heated Cabinet
11 Ice Cream Box
12 Cashier Stand
14 Frost Top
15 Flat Top
17 Beverage Refrigerator: Counter-top Model
18 Refrigerated Display
19 Flatware/Napkin Cart
28 Hose Reel
56 Hand Sink
60 Work Table
79 Work Table
96 Refrigerated Display
97 Paper Tray Dispenser

Provide option to convert some hot wells to flat top space
Sneeze guard to allow self-service at Grab & Go

Roll-Down Grilles
Notes:
30 U.D.S.
31 12 Gallon Kettle
32 40 Gallon Tilt Skillet
34 Convection Steamer
35 Conveyor Oven
37 Cook and Hold Oven
40 Combi Oven
42 Convection Oven
90 Exhaust Hood
91 Stainless Steel Ceiling Panels
94 Floor Trough
95 Floor Sink
Shelf above desk

Safe in closet is preferred

Windows to provide visual access to kitchen

Alternate safe location under counter; position away from sight line of door

Notes:
74 Desk
75 Safe
76 Closet

† Electrical Outlet
† Electrical Outlet Above Desktop
▼ Phone and Data Outlet
▼ Data Outlet
★ Speaker for Phone
Notes:
8 Tray Dispensers
28 Hose Reel
56 Hand Sink
66 Pot and Pan Sink
67 Wall-Mounted Pot Rack
77 Mobile Pot Shelf
80 Silver Soak Sink
81 Soiled Dish Table
82 Collector
83 Dishwasher
85 Dishwasher Ducts
86 Loader
87 Clean Dish Table
89 Unloader
94 Floor Trough

Roll down grill ends at dish return