

**WASHINGTON COUNTY BOARD OF
EDUCATION**



**DEPARTMENT
OF
FACILITIES PLANNING AND DEVELOPMENT**

**STANDARDS FOR THE DESIGN AND
CONSTRUCTION OF NEW EDUCATIONAL
FACILITIES**

Revised: September 25, 2008

P.O. Box 730
820 Commonwealth Avenue
Hagerstown, Maryland 21741

DIVISION I-GENERAL REQUIREMENTS

The A/E is required to provide a Division I specification section based on the CSI Master Specification format. The following General Requirements shall be included, at a minimum. The Washington County Board of Education will be referred to in the balance of this document as the BOE.

01010 SUMMARY OF WORK: The A/E is to identify all work covered by Contract Documents specific to, contract type (ie: CM Multi Prime, CM-GMP, GC, Design Build), work under these contracts, contractor use of premises, occupancy requirements, project phasing and project schedule.

01020 ALLOWANCES: The A/E is to identify and schedule cash/quantity allowance provisions, define Contractor's costs and any administrative procedures for allowance use.

01025 MEASUREMENT AND PAYMENT: The A/E is to identify administrative procedures for contractor application for payment that is consistent with the State of Maryland PSCP Policies and Procedures guidelines.

01030 ALTERNATES: The A/E is to identify and coordinate provisions for ADD alternates that are, in the opinion of the A/E, valued at least ten percent (10%) of the overall construction cost so that adjustments to overall construction costs can be made at bid time without re-design or delay to the project.

01031 UNIT PRICES: The A/E is to identify, schedule and coordinate unit price units of measurement, estimated quantities and any administrative procedures for allowance use.

01040 COORDINATION: The A/E is to specify administrative requirements to ensure that the contractor will coordinate all parts of the work. This coordination effort shall include verification of the project schedule during design and review of the project schedule throughout construction to ensure delivery of the project.

01050 FIELD ENGINEERING: The A/E is to specify required contractors survey work, building layout, profile staking and any other field engineering requirements.

01090 REFERENCES: The A/E is to provide necessary definitions for the contract documents that are clear and consistent throughout the documents. Definitions should include any acronyms, trade names or code references used that might not otherwise be clear.

01100 SPECIAL PROJECT PROCEDURES: Contract Documents shall adequately identify any and all special conditions pertinent to the project along with appropriate measures for dealing with any special conditions. Consideration should, at a minimum, include: Project schedule, project phasing, protection of building components and occupants, temporary facilities, staging and other special conditions that exist for a particular project site.

01200 PROJECT MEETINGS: The A/E is to identify administrative procedures for pre-construction conferences, regularly scheduled progress meetings, responsibility for recordation of meeting notes, and any other related procedures.

01400 QUALITY CONTROL: The A/E is to identify requirements for a contractor's quality control process that will ensure high quality project delivery. This contractor process must include the means and methods by which the contractor will ensure the; procurement, delivery and installation of quality products; good workmanship, appropriate inspection/testing, system start-up and project closeout.

01500 CONSTRUCTION OF TEMPORARY FACILITIES: The A/E is to establish parameters for contractor provided temporary utilities and/or facilities required to support continued operation of the facility, the continuation of the project and support for other trades.

01650 FACILITY STARTUP/COMMISSIONING

01700 CONTRACT CLOSEOUT: The A/E is to establish specific administrative procedures for the orderly completion of the project. Procedures shall include definition of requirements for: a timeline for project closeout milestones; System Commissioning; Substantial Completion; Punch-list requirements; As-Built Drawings; Operations and Maintenance manual delivery requirements; Final Acceptance requirements; Warranties/Guarantees and any penalties for late completion.

01800 MAINTENANCE

DIVISION 2 - Sitework

02010 - Subsurface Investigation & Demolition: A/E to provide Test borings as an additional service.

02050 – Demolition: Particular attention will be required to the safety of building occupants and the scheduling of any demolition that needs to occur in an occupied or partially occupied facility.

02200 – Earthwork: Appropriate sediment and erosion control measures must be specified and must be in accordance with Washington County Government Regulations.

An appropriate layer of topsoil, as determined by the A/E, shall be provided for site areas touched by any construction activity. Topsoil is to be clean and screened and shall be placed over all areas that are to be seeded. Topsoil for playfields, and/or other areas determined appropriate by the owner, must be screened of stones no larger than 2 inch in diameter. Appropriate soil additives shall be provided to ensure proper turf growth.

Independent soils inspection and testing services to be provided by a separate BOE consultant or as otherwise directed.

Unit pricing for open site and trench rock to be established as part of the specification. The A/E is to evaluate the need for an allowance or allowances that define rock and deal with any and all removal requirements.

02500 - Paving and Surfacing: BOE prefers a separate entrance and circulation pattern for buses and cars.

The current minimum turning radius for a school bus is 50'-0". Requirements are to be verified on a project by project basis with input from the BOE Transportation Department

Entrance drive(s) shall have a 30' minimum width.

Bus stacking area(s) shall be sufficient to meet any Education Specifications requirements.

As a general rule driveway grades should not exceed 5%. Acceleration/ deceleration lanes and areas to be designed at school entrances shall be in accordance with State Highway and Washington County Government requirements.

In designing road and parking lot paving sections the A/E shall look to the current Washington County Government standards (Design Manual-Roads and Storm Drains) for section requirements.

02600 Utility Piping Materials: Be sure all piped utilities are clearly shown on drawings.

Clearly detail and locate any water meter vault(s) on the site plan. Any vault shall be designed to comply with local regulations, consider remote read capability in jurisdictions that support this approach.

For underground sanitary and storm water piping installations comply with County Government standards.

Coordinate the installation of any piping under roads with all existing or new utilities.

02700 Sewerage & Drainage: All sewage and drainage must adhere to all applicable federal, state and local codes.

All downspouts and rain leaders to connect to underground storm drains.

Any storm drain inlet grates are to be bolted in place.

The A/E is responsible to design, inspect and certify storm water management ponds and facilities. Completed facilities must be in compliance with Washington County Government requirements and must be accepted prior to the completion of A/E responsibilities. The contractor must provide a one (1) year maintenance program for storm water management ponds that extends one year past Washington County Government acceptance of the facility

02780 – Power & Communications: The A/E shall provide for underground conduits from the building to the site perimeter, at an appropriate location, for future telephone and cable TV service installations, as well as power to a location near the main entrance for lighted school signage.

The A/E shall provide appropriate duct banks in coordination with the power company for power into the building.

02800 Site Improvements

Provide handicapped accessibility meeting ADAAG, codes and Maryland Building Code for the Handicap (COMAR). The strictest interpretation shall apply.

Chain link fences should be provided as directed by the Educational Specifications.

Provide appropriate signage for traffic patterns and handicap accessibility.

Playground Equipment – The A/E shall consider the possibility of a future tot lot at any given school site. In the design of a site the A/E shall determine the most appropriate location for Playground Equipment and provide delineation of this location on drawings.

The A/E shall set aside sufficient space for a least two future portable classrooms adjacent to other classroom areas of the building. An area of 100'X100' should be sufficient for this purpose.

02900 Landscaping

Curb, Gutter & Sidewalk

All concrete shall be manufactured, transported and placed in accordance with current American Concrete Institute (ACI) standards. Provide reinforcement wire or fiberglass mesh in all concrete sidewalks and floating slabs. Prepare sub grade properly and specify appropriate

soil-bearing capacities for individual slab types/locations. Interior slabs shall have a minimum thickness of 6". Exterior slabs shall have a minimum thickness of 4". In general curbs shall be eight-inch (8") non-mountable type. Parking lot islands with maintainable grass areas shall have a mountable curb section large enough for mower access. Exterior building stoops shall have turndowns to a point below the frost line. If a handicap ramp or steps meet a stoop these items shall also have turndowns to a point below the frost line.

Any and all exterior concrete that will be exposed to weather shall be air entrained to meet ACI standards for this geographical region.

All sidewalks shall be 5'-0" wide, expansion joints and any scored joints as recommended by the ACI with a broom finish.

Handicap ramps, in sidewalks, shall have an exposed aggregate finish.

Provide separate passenger drop off and handicap loading and unloading zones away from bus loading/unloading area. The A/E must ensure that van accessible parking spaces meet current codes in size as well as location.

The number of parking spaces shall be based on the capacity of public assembly area in 1-4 ratio or as otherwise directed by the Ed-Spec.

On slopes greater than 30%, an appropriate maintenance free ground cover, such as Crown Vetch, is to be provided to minimize future maintenance efforts.

Comply with the Maryland State Forest Conservation Program and the Washington County Forest Conservation Program

Trees are not to be planted in clear site area of driveway street intersections for visibility purposes.

DIVISION 3 - Concrete

03000 GENERAL: This Division deals with the design of concrete elements of a building essential to the support of the design loads imposed on the structure as well as elements that may be architectural in nature.

03300 CAST IN PLACE CONCRETE: Foundations – BOE encourages use of thickened turn down slabs for support of interior masonry walls.

Structural Design – No post tension designs.

Finishes – The A/E shall provide slab flatness and finish criteria that will eliminate the need for further slab preparation at the time of floor covering material installations. Specification of appropriate “f” flatness standards in lieu of the traditional 1/8” in 10’ shall be provided by the A/E. The A/E shall also ensure that drain placement criteria provided in other specification sections coordinate with flatness standards to ensure proper placement and operation of floor drains. Ensure that “f” standards established are appropriately coordinated with floor finish requirements for all areas.

COORDINATION:

Coordinate the location and placement of foundations with Civil, Geotechnical and Architectural designs.

Coordinate the placement of all structural members with all other specialties such as Electrical, Mechanical, HVAC, etc.

The A/E is expected to make site visits sufficient to ensure that no detail of existing conditions is omitted from the design.

For the renovation of an existing building or specialty structure, the A/E is expected to use existing documents and to verify with field measurements in order to ensure that changes due to unexpected field conditions will be minimal.

The structural design shall not include embedment of items other than structural components in elevated slabs.

QUALITY CONTROL:

Specify field quality control methods any applicable codes, standards and regulations.

CONCRETE FORMWORK:

Water curing is encouraged. Curing compounds are discouraged.

CONCRETE REINFORCEMENT:

Provide reinforcement wire in all cement sidewalk construction with adequate expansion at regular intervals. Floor slabs within the building to be a minimum of 6” thick and may have fiberglass-entrained reinforcement in lieu of wire mesh.

DIVISION 4 - Masonry

GENERAL

This Division deals mainly with unit masonry, mortar and accessories related to unit masonry. BOE prefers the exterior of buildings to be brick masonry with appropriate accent materials and block back up. Other systems may be considered where cost is an issue.

DRAWINGS/SPECIFICATIONS:

Indicate on drawings the following information related to Unit Masonry:

Extent of each type of engineered and empirically designed masonry and delineate, as required, to show dimensions (nominal thickness, cavity width, setting bed thickness, (etc.) and construction (single wythe, multi-wythe, composite, cavity, etc.).

Structural requirements are to be coordinated with ACI and any other applicable standards. Provide compressive strengths ($f=m$) on drawings.

Provide details of anchors, ties, reinforcing, joint reinforcement, lintels, chases, recesses and/or openings for other construction.

The use of standard sizes and colors for all brick masonry is strongly encouraged. Non-standard sizes and colors are to be used only with the permission of Washington County Public Schools.

Provide structural bonding between wythes (continuous wire reinforcing) and spacing of same.

Determine the extent of insulation required for cavity walls and in any hollow core units. Drawings shall detail insulation placement including penetration details.

Show the location of movement joints and details of each type of movement joint. Show isolation joints between masonry and concrete, and masonry and steel framing, if any.

Show the location, types, and details of all items to be built into masonry, such as anchors, ties, inserts, lintels, flashing, reglets, insulation and nailers.

Show details of special bearing areas (particularly for hollow unit masonry) showing extent and type of high-strength units, such as solid CMU areas in hollow CMU walls, grout or concrete fill for hollow CMU, bond beams, and other special construction required for structural bearing.

Show details of all masonry lintels used.

Show fire resistance ratings (2,3,4 Hour, etc...), if any.

Utilize bull-nose masonry on all exposed interior corners.

Strike all joints above and below grade whether exposed or not.

Chipped or cracked masonry blocks are not to be used.

Consider double masonry sand (other?) filled walls at interior music room partitions or provide an alternative approach to sound attenuation.

Provide sound block with insulation on interior gym walls as appropriate or provide an alternative approach to sound attenuation.

04100 – MORTAR: If the A/E has any expectation for use of pigmented mortars these shall be specified so that desired colors are bid. Selection of colors not included in a bid will not be acceptable. Standard colors should be selected whenever colors are desired.

04150 - MASONRY ACCESSORIES: Horizontal joint Reinforcement: Truss type in single wythe masonry walls, Aladder @ type for cavity walls; ASTM A 153, Class B2 hot dipped (1.50 oz./sq. ft.) After fabrication wire finish for exterior walls; ASTM A 641, 0.10 oz./sq. ft. Mill galvanized, for interior masonry walls.

Adjustable wall ties, veneer anchors, column anchors, dovetail or channel slot/anchors, buck/frame anchors in exterior walls: hot dip galvanized.

Provide asphalt coated copper flashing at all window heads and sills and at all door heads as well as slab and top course flashing.

04200 - UNIT MASONRY: Brick Unit Masonry and Concrete Unit Masonry: Design/specify vertical and horizontal expansion joints, control joints, per Brick Institute of America (BIA) for brick masonry and National Concrete Masonry Association (NCMA) recommendations for concrete masonry as applicable.

Design/specify cavity-wall exterior masonry walls, with insulation, reinforcement and brick grade to minimize moisture penetration. Special care shall be directed to the need for a minimum cavity size and the need to ensure that mortar does not fall into the cavity during construction.

Specify cold-weather construction provisions whenever the construction schedule indicates cold seasonal conditions will be likely.

Specify field-constructed mock-ups for exposed unit masonry and stone masonry, of size and complexity appropriate to the scope of unit masonry work on the project. Coordinate with BOE Project Manager on required scope for mock-ups.

Specify weep-holes to be provided with 3/8" diameter cotton sash cord of length required to produce 2" exposure on exterior and 18" in cavity between wythes; further, provide cotton sash cord for full length at bottom of cavity and bottom of thru-wall flashing, crossing over, and in contact with, cords leading to weep holes.

If the A/E considers the use of glazed block as a finished masonry product this product shall be specified as an alternate only. The base material shall be standard block with bull nosed corners with block fill/paint.

DIVISION 5 – Metals

05010 Metal Materials, Finishes & Fastenings: Specify all steel and metal materials to be manufactured in USA.

05030 Metal Coatings: Provide priming and painting of all metal fabrications for stairs, railings, handrails, supports and mechanical framework.

05100 Structural Metal Framing:

Specify steel manufactured in the USA.

Exposed structural steel is not to be field cut with a torch.

Special attention is required in the design process to ensure that steel lintels are incorporated into construction documents and fully detailed as to size, location and quantity.

All structural metal framing to be painted with primer unless it is to coated with sprayed on fireproofing.

05200 Metal Joists: All structural metal framing to be painted with primer or otherwise coated to resist corrosion.

05300 Metal Decking: Metal decking to be galvanized both sides.

05500 Metal Fabrications: Provide priming and finish painting of all metal fabrications for stairs, railings, handrails, supports and mechanical framework.

Any stainless steel shall be minimum of schedule 300.

DIVISION 6 Wood & Plastics

06100 Rough Carpentry: All exterior lumber with the potential to come in contact with water shall be pressure treated material(s).

06200 Finish Carpentry: Casework for classrooms, offices and other administrative areas of the building shall be plywood based (Five-ply hardwood $\frac{3}{4}$ " thickness) with .050 minimum high-pressure laminate skins. Use of particleboard or MDF based core materials will not be permitted. Use of preformed factory edge bands are discouraged and may be considered. Base casework cabinets shall have an integral base structure that is a part of the fabricated casework cans rather than a separate assembly that would be applied at the time of installation.

Any exposed wood fasteners shall be stainless steel or chrome.

06300 Wood Treatment: All exterior lumber with the potential to come in contact with water shall be pressure treated.

06400 Architectural Woodwork: Mail slots shall be plywood based (Five-ply hardwood $\frac{3}{4}$ " thickness) with a red oak veneer and a clear finish. Each mail slot should be able to hold a three (3) ring binder laying flat and each slot should be a minimum of four (4) inches in height. Total count of slots will be determined by school size.

Media Center reading/circulation area millwork/casework shall be designed with consideration for State guidelines for collection size unless otherwise directed by the EdSpec. Media Center stack areas shall have shelving units in the following heights: Units along walls shall be 60" in height, units in open stack areas shall be 42" in elementary schools and 48" in middle and high schools. Circulation desk units shall be 30" in elementary schools, 36" in middle schools and 39" in high schools. Circulation desk workstations should have a standard 30" work surface height at all school levels. Approximately 1/3 of Elementary school collections are to be picture books and require specialized shelving. Quantities to be verified during design.

Media Center millwork/casework should include all required components as a part of the construction package (stacks, workstations, tables, chairs, etc...). All components should come from a single manufacturer to ensure that all finishes match. For the base design BOE requires all media center millwork/casework be constructed with solid core lumber (core wood to be basswood, aspen, or poplar) or plywood core (Five-ply hardwood $\frac{3}{4}$ " thickness minimum) with a red oak veneer and a clear finish. Tabletops and work surfaces should have a high-pressure laminate finish (over plywood core) in a color selected by the A/E. Book cases may have individual high-pressure laminate tops or units may be joined into groups (twelve foot maximum joined length) and may have single high-pressure laminate tops over these group units.

No particleboard, plywood, wheat board nor any other composite materials will be acceptable. Manufacturers that are acceptable to BOE are Brodart, Library Bureau and Warden. Any deviation from use of the listed manufacturers must be approved by BOE prior to inclusion in specifications.

System Specifics:

Warranty:

Furniture and shelving-Five years

Seating-Two years

Table leg connection to table top- Lifetime Finish

All wood surfaces shall have a catalyzed conversion sealer and a topcoat sealer, which may be catalyzed conversion varnish or conversion varnish. All finishes must be oven dried.

Circulation Desks:

Circulation desk are to be modular with module lengths that do not exceed four (4) feet and must be individual freestanding units that can be re-arranged without disassembly.

Desk modules shall have factory installed wiring grommets in end panels and tops.

Circulation desks units shall be constructed with solid core lumber (core wood to be basswood, aspen, or poplar) or plywood core (Five-ply hardwood veneer plywood $\frac{3}{4}$ " thickness minimum) with a red oak veneer and a clear finish.

Shelves must be minimum 5-ply hardwood veneer plywood. Each desk module is to have two end panels with oak veneer and finish.

Shelving:

Shelving units are to be modular with module lengths that do not exceed four (4) feet and must be individual freestanding units that can be re-arranged without disassembly.

End and intermediate panels must be a minimum of $\frac{3}{4}$ " thick, Solid core lumber (core wood to be basswood, aspen, or poplar) or 5-ply hardwood veneer plywood. Shelves must be a minimum $\frac{3}{4}$ " thick solid core lumber with a minimum 2" deep solid red oak nosing. Shelf support system must be pin and hole type. Shelf fit in shelf cases must have close tolerances (A/E to determine) to avoid shelf shift, twist, and slippage.

Work Surfaces:

High-pressure laminate tops minimum .050 with solid red oak edge bands with a bullnose design and shall be solid red oak that must extend $\frac{5}{8}$ " out from the plywood substrate, no particle board, MDF, wheat board or composite core materials will be permitted.

Chairs:

Chairs must have been independently tested as prescribed in the American Library Association's "Library Technology Reports, Volume 31, Number 2 (1995)". Wood to be solid red oak with a clear finish.

Tables:

Tabletop construction shall consist of a solid hardwood core (1"). Core wood to be basswood, aspen, or poplar. Laminate top surface to be minimum .050 high-pressure laminate. Edge bands on tabletops must extent a minimum of $\frac{5}{8}$ " out from the substrate with a bull-nose design and must extent below the top to completely conceal the thickness of the leg connector plate.

If the A/E elects to specify electrical/communication raceways through any Media Center casework via the casework manufacturer rather than local installation by a licensed electrician

raceways will need to be UL approved at the casework factory.

DIVISION 7 Thermal and Moisture Protection

07195 Air Barriers: Exterior walls should be constructed utilizing appropriate air barriers to reduce infiltration.

07200 Insulation: Exterior wall and roof assemblies should include a vapor barrier that may be provided as a part of insulation products.

All insulation is to be asbestos free.

No loose blown Fiberglass insulation is permitted.

Verify that roof deck insulation is compatible with membrane roof and approved by the specified roofing manufacturer.

07240 Exterior Insulation and Finish Systems: The use of EIFS is strongly discouraged, and may only be used in certain applications (such as soffits) with the permission of Washington County Public Schools.

If EIFS systems are used a water management system shall be provided as a part of the EIFS system to ensure the integrity of the wall throughout its life.

07250 Fireproofing: Use of gypsum board sheathing as a fireproofing method in roof assemblies is discouraged.

Use of sprayed on fireproofing materials is discouraged on the underside of roof decks.

07400 Manufactured Roofing and Siding: Any sloped metal roofing shall be provided with the same leak proof warranty as membrane roofing, 20 year ND. This will require installation of a ice and water shield membrane under any metal roofing. Metal surfaces shall also be warranted for 20 years, ND.

Any sloped metal roofing must be provided with snow guards.

Any sloped roof shall be designed with built-in gutters rather than hanging gutters.

Gutter width required shall be 6" minimum

07500 Membrane Roofing: Any proposed systems must have a 20YR ND leak proof warranty. As BOE participates with the State of Maryland in IAC funding of school projects the A/E needs to design roofing systems with State standards in mind. State data is available at the following site: (www.dgs.state.md.us/overview/const2.htm)

Washington County Board of Public Schools first preference in low slope roofing membrane systems is a built up roof (BUR). Where BUR is used the system is to be a hot mopped four-ply

built-up (BUR) asphalt roof. Acceptable systems are 4GIG roof by Johns Mansville, Firestone, GAF or Celotex.

A single ply membrane roofing system may only be considered if the need for value engineering occurs in the area of roofing systems.

All roofing must meet Factory Mutual FM-I90 uplift ratings for use on BOE facilities.

Every effort should be made to minimize rooftop penetrations.

07600 Flashing & Sheet Metal: All flashing & sheet metal associated with roofing shall be provided in such a manner that the roof manufacturer will be able to provide the required 20 year NDL leak proof warranty. Special attention is to be directed to flashing heights at any roof penetrations and/or changes in elevation.

Provide details showing flashings at all widow and door head locations for all exterior walls.

Roof perimeter edge flashing shall be a minimum .050 aluminum.

Roofing expansion joints shall be curb mounted.

Color preference: Mill finish aluminum on new projects, Kynar color to match existing on existing facilities.

All downspouts to connect to storm drain system with cleanouts per code.

All masonry flashing shall be a minimum of 16-ounce asphalt coated copper.

07700 Roof Specialties & Accessories: Any specialties or accessories shall be provided in such a manner that the roof manufacturer will be able to provide the required 20 year NDL leak proof warranty. Special attention is to be directed to flashing heights at any roof penetrations and/or change in elevations.

07800 Skylights: Skylights are not permitted! Any day lighting is to be provided by vertical clerestory type windows only.

DIVISION 8 - Doors and Windows

08100 Metal Doors & Frames: Door openings shall meet all applicable codes in relation to ingress/egress and ADA. Doors shall have a minimum clear opening of 36". Exceptions may be made only to closets without clear floor space.

All exterior doors are to be fully insulated. An R-value equal or greater to windows shall be provided.

Any exterior steel frames are to be 14 gauge minimum thicknesses. Any steel frames are to be galvanized and to be coated with a bituminous undercoating material at concealed surfaces to retard rusting.

08200 Wood & Plastic Doors: Door openings shall meet all applicable codes in relation to ingress/egress and ADA. Doors shall have a minimum clear opening of 36". Exceptions may be made only to closets without clear floor space.

Interior wood doors are to be solid core wood veneer. Machine, size and finish all doors at the factory. Door thickness to be 1 3/4". The specified manufacturer shall provide a ten (10) year warranty for doors.

Face veneers to be standard 2 or 3 ply face panels, natural oak premium grade. Match faces and grade of non-rated doors of same area of building.

Require door and frame construction at labeled doors to be in accordance with applicable codes and UL requirements. Provide metal embossed label designating UL classification.

Specifications should allow sufficient clearances between doors and frames to ensure that BOE does not experience problems with sticking doors during the first year of operation when doors acclimate themselves to local humidity conditions.

08250 Door Opening Assemblies: Factory produced door openings complete with frame; door and hardware are to meet all hardware requirements listed elsewhere. Assemblies of this type should include continuous full height hinges.

08300 Special Doors: Any overhead panel or coil roll-up doors at the exterior of any school facility shall be fully insulated.

08400 Entrances and Storefronts: Extruded aluminum insulated framed systems with insulated glass panels and doors shall be provided with consideration to heavy use, durability, and maintainability.

Units are to be classified commercial and shall meet AAMA grade and performance class HC40 for exterior installations and class C25 for interior.

Finish preference: Clear Anodized Aluminum finish

The A/E is to determine appropriate "U" values relative to the overall building design and should

establish appropriate system insulation values that meet or exceed a "U" value of .5.

All exterior glazing to be Low-E type.

08500 Metal Windows: Window units to be classified commercial and shall meet AAMA grade and performance class HC40 for exterior windows and class C25 for interior windows

Finish preference: Clear Anodized Aluminum finish

Aluminum framing with insulated safety glass at exterior locations.

The A/E is to determine appropriate "U" values relative to the overall building design and should establish window insulation values that meet or exceed a "U" value of .5.

Window screens shall be aluminum mesh, metal hardware, and must be easily removable from the inside of the building.

Special consideration is to be given to the type of windows used in relation to pedestrian traffic walking near or under window.

08600 Wood & Plastic Windows: No wood or plastic windows are permitted.

08710 Finish Hardware: A Hardware specification will be supplied during the Design Phase

DIVISION 9 - Finishes

09100 Metal Support Systems: Wall/partition support materials are to be a minimum of 26 gauge. Studs, runners & furring member gauges as required to meet overall system structural requirements.

09200 Lath, Plaster

09250 Gypsum Board: Use of drywall in ceilings is generally discouraged except where required by applicable codes.

Provide appropriate access through any hard ceilings at all equipment and/or valving locations.

In high impact areas any drywall should be high impact rated materials or be backed with plywood backer boards.

Minimum dry wall thickness is 5/8".

09300 Tile: In food preparation areas provide glazed ceramic tile on wet walls, all other walls to have an epoxy painted finish. Ceramic tile on all walls will be an alternate bid.

In bathrooms BOE prefers glazed ceramic tile on wet walls with all other walls to have an epoxy painted finish. Ceramic tile on all walls will be an alternate bid.

Structural glazed block or ceramic tile may be used as a wainscotings, or to full height, in hallways or other public areas. This material shall only be specified as an ADD ALTERNATE to the base bid of painted block or drywall.

If a glazed block or ceramic tile wainscotings is used heights should be provided as follows:

Elementary - four feet above finished floor.

Middle - Five feet four inches above finished floor.

High - Five feet four inches above finished floor.

The A/E should consider seamless troweled epoxy floors and pigmented concrete floors as alternate floor finishes for wet areas such as bathrooms, shower rooms and locker rooms.

09400 Terrazzo: Base floor tile is VCT. Pigmented concrete floors and terrazzo type flooring systems may be considered for hallways, lobbies and public areas. The most economical finish shall be the BASE design with any others listed as ADD ALTERNATES.

09500 Acoustical Treatment: Specify standard 2' x 4' square lay-in wet-formed mineral fiber ceiling tile in minimum thickness of 5/8". Acoustical properties shall be NRC 0.55 in accordance with ASTM C423-00 and CAC minimum 35 in accordance with ASTM E1414-00. Flame spread/fire resistance shall be Class A: Flame Spread 25 or under (UL Labeled) per ASTM 1264. The ceiling panel is a medium texture directional-fissured image per ASTM E1264 Classification: Type III, Form 2, and Pattern C D.

Fiberglass tile is not acceptable.

09550 Wood Flooring:

GENERAL DESCRIPTION

Architect prepared specifications for installations of maple wood flooring systems or repairs are to be complete and comprehensive.

WARRANTY

The warranty period shall be two (2) years from substantial completion and must cover both labor and materials. During the (2) two-year warranty period the contractor shall make any and all necessary adjustments to materials and equipment installed and perform any work necessary to ensure the proper functioning of installed systems.

PRODUCTS

Wood Flooring Systems to be manufactured by AConnor@/ANeo-Shok@ or approved equal. Wood flooring systems and materials from non-approved M.F.M.A. manufacturers will not be acceptable.

MATERIALS AND WORKMANSHIP

Materials:

Vapor barrier – A/E to determine.

Resilient pads - AConnor Neo-Shok@ or approved equal pads, 3/4" thick, hemispherical, two stage, polyurethane, Red - 70D durometer.

Sub-floor - 2 layers of 15/32" APA rated plywood sheathing, Exposure 1.

Sleepers - 2" x 4" - pressure treated pine.

Flooring (Maple) 25/32" X 2-1/4", Second & Better Grade, Northern Hard Maple Flooring, marked and stamped as approved T.G.E.M. & M.F.M.A. Grade.

Flooring fasteners – A/E to determine.

Sub-floor fasteners – A/E to determine.

Finish materials - oil base modified polyurethane seal and finish or equal.

Game Line Paint - Game line paint shall be compatible with floor surface finish.

Wall Base - 3" X 4", heavy duty, molded, vented cove base with pre-molded outside corners.

9650 Resilient Flooring:

All floor tile materials shall be free of asbestos.

Lobbies – VCT or Pigmented concrete as BASE bid, terrazzo type flooring systems as an ADD ALTERNATE only

Corridors – VCT or Pigmented concrete as BASE bid terrazzo type flooring systems as an ADD ALTERNATE only.

Cafeteria & Platform – VCT or Pigmented concrete at Elementary and Middle Schools.

Gym Floors - Middle & High - wood floor in gym. Corners to be inlaid
Elementary – VCT with wood floor as an Add Alternate.

Gym Line work to be inlaid VCT (not paint).

Performance platforms at High Schools shall meet state recommendations for this type of space. Performance platform areas (stages) shall have a floor suitable for drama use (nailing among other things) and dance (resilient) activity presentations. A floating floor of tempered hardboard on two layers of ¾" plywood and rubber pads with a painted black finish shall be provided. Hardwood strip flooring will not be acceptable.

09680 Carpet: Use of carpeting as a floor covering in school facilities is generally discouraged except in administrative areas, kindergarten, childcare and media centers. Placement of floor coverings is to be defined by the educational specifications on a project-by-project basis. Manufacturers that have met the following product specifications at one time were Shaw, Mannington, Collins and Aikmen, Interface. Architect must review manufacturers for each project in order to confirm these manufacturers continue to meet this quality.

PRODUCTS

Construction:	Textured Loop, multicolored
Pattern:	Multicolored
Face Yarn:	100 % Solution Dyed Nylon – No mill extruded nylons acceptable
Gauge:	1/10, 1/12 or 1/13
Pile Height:	.109 inch
Stitches per inch:	9.0 per inch
Edge Ravel:	20 year warranty against edge ravel
Delamination:	20 years warranty against delaminating
Dye Method:	Solution Dyed by fiber manufacturer and warranted by fiber manufacturer, not carpet manufacturer
Yarn Face Weight:	20 or 28 /sy minimum
Stock Width:	6 or 12 Foot
Soil Resistance:	Flouro-chemical Treatment as provided by the Fiber Manufacturer
Stain Release:	Durable stain inhibitor should be applied to the fiber during product manufacturing to resist fiber staining and soiling. (Minimum average of three fluorine analyses of a single composite sample per CRI TM-102: 500 ppm.)
Density:	8,129-oz/cu yd
Primary backing:	Synthetic woven or non-woven
Secondary Backing:	Closed cell, Vinyl cushion or equal to comply with the following:
Density (ASTM D-1667):	18.5 lbs/cu ft +/- 5%
Compression Set (ASTM D-1667):	Max 10%
Compression Deflection (ASTM D-1667):	Min 7psi @ 25%; Max. 25 psi @25%
Impermeable to moisture and airflow	
Provide for a chemically welded seam that is also impermeable to moisture and airflow	
12' width roll goods	

Indoor Air Quality ASTM D-5116:

Product inclusive of "dry" adhesive system meets criteria established by the State of Washington Indoor Air Quality Specification for Carpet and/or Carpet & Rug Institute's (CRI) Indoor Air Quality Carpet Testing Program. If "dry" adhesive (2.02E) not available from manufacturer and "wet" adhesive is used to install the product, carpet and adhesive to meet CRI's Green Label requirements.

Moisture Barrier:

Certified to pass the British Spill test, Method E(Part 2) after 25,000 cycles on the Roller Caster Chair Test (DIN Test Standard 54324), installed per CRI 104-96 installation guidelines.

Quality Assurance Installation must be performed by FCIB certified installers or manufacturer certified dealers. Contractor must be able to supply valid documentation of board certification. Flooring Contractor must have not less the five (5) years experience. All installation procedures/guidelines required and/or recommended by the carpet manufacturer shall be followed. Contractor must use adhesive and seam sealer manufactured by or recommended by the carpet manufacturer. Adhesive must be a low VOC emitting wet-set adhesive to meet CRI's Green Label requirements.

Trowel Size:

A minimum trowel size is 1/8 inch wide x 1/8 inch deep, "V" notch, spaced at 1/16 inch. A 100% adhesive transfer is required.

WARRANTY**Wear**

Must be warranted for commercial use. Manufacturer must warrant that the specified product will retain a minimum of 90 percent of its face fiber for a minimum of ten (10) years. Any area showing loss of face fiber greater the manufacturer shall replace that 10%. Replacement includes labor and materials.

Edge Ravel

The manufacturer shall warrant carpet will not edge ravel for the 20 year warranty period.

Delamination

The manufacturer shall warrant carpet will not delaminate for 20 year warranty period.

Stain Removal

Carpet or fiber manufacturer shall warrant for ten (10) years that there will be no significant change in color due to exposure from light or atmospheric contaminants. Furthermore, carpet will resist permanent staining caused by spots and spills, for a minimum of ten (10) years.

09800 Special Coatings: Terrazzo type seamless flooring and/or troweled epoxy type flooring systems may be considered.

09900 Painting: Acrylic latex as the general rule, special paints such as epoxy as required by space conditions.

Paint all walls of all spaces including Mechanical/Electrical spaces. Floors in Mechanical/Electrical spaces shall be sealed concrete or painted/pigmented concrete.

Provide lead and mercury free paints only.

09950 Wall Coverings: Fire retardant if used.

DIVISION 10 - Specialties

10100 Visual Display Boards: Specify ten-year warranty on marker boards and ten-year warranty on chalk and tack boards.

Marker/chalkboards shall be mounted on the walls at the following heights above the finished floor:

Kindergarten	24"
1st-3rd Grade	30"
4th-5th Grade	32"
6th-8th Grade	36"
9th-12th Grade	40"

10150 Compartments and Cubicles: Health room cubicle curtain and track shall accommodate 72" health room cots.

10200 Louvers and Vents: All louvers and vents to be aluminum material with insect screens provided.

An aluminum mill finish or clear anodized finish is preferred, where a painted color is suggested the finish must be Kynar over aluminum.

10250 Service Wall Systems: Provide for built-in drinking fountains, fire hose cabinets and fire extinguisher cabinets.

Paper towel dispensers are to be surface mounted and provided by BOE. The A/E shall call for solid wood mounting blocks for towel dispensers.

10260 Wall and Corner Guards: Provide corner guards in corridors where drywall is used. Guards from floor up to 48" above finished floor.

10270 Access Flooring: None

10350 Flagpoles: Aluminum or fiberglass poles are acceptable. If aluminum is used provide a mill finish or clear anodized finish. Poles shall be free standing with external halyard systems with provision for attachment of two flags. Provide 360-degree pulleys. Counterweighted poles will not be permitted.

10400 Identifying Devices

Room signs shall be mounted on the wall adjacent to the subject room door on the latch side and shall be installed at proper ADA handicap height. Signs should include the room name or number on sign. As some room uses change over time some select rooms may have only the room number. Signs are to be a flat plastic (6"x6" base size) plaque with raised names/numbers and braille translations.

A bronze plaque noting the name of current BOE Board Members, the current Superintendent, and the current Board of County Commissioners and the date of project completion is to be provided near the main entrance. If State funding is provided the plaque shall also bear the names of the current State Board of Public Works.

10450 Pedestrian Control Devices: Portable posts, railings, electronic detection portals.

10500 Lockers: Student lockers are to be provided in sufficient numbers to accommodate all students in the school. Lockers shall be of steel construction with sloped tops if tops are exposed along with the ability to accommodate a padlock. All lockers shall be mounted on concrete bases in sizes as noted in educational specifications.

A locker numbering system shall be specified by the A/E with numbers beginning with 001 and ending with the total number of lockers.

Lockers accessible to the handicapped shall be installed at the beginning or end of each locker run or grouping.

10530 Protective Covers: If entrance canopies are desirable at main entrances to facilitate unloading/loading of busses in inclement weather these canopies shall be identified as ADD ALTERNATE items in the bid.

10550 Postal Specialties: See Architectural woodwork section - 06400

10650 Operable Partitions: Operable partition use is generally discouraged due to long term maintenance concerns.

10670 Storage Shelving: Metal shelving is preferred.

10800 Toilet & Bath Accessories: Toilet partitions are to be double panels with doors to be with anti-grip tops and tamperproof screws, bolts, etc. Stainless steel is preferred, solid core materials may be considered as a cost savings to stainless steel. The A/E shall specify appropriate blocking for attachment of partitions in other sections of the specification. Toilet partitions are to be floor mounted whenever possible. Partitions that are supported from above or a wall only are not permitted.

Provide surface mounted 3/4" solid blocking material for paper towel dispensers, soap dispensers & toilet paper holders as required.

DIVISION 11 – Equipment

11050 Library Equipment: Movable book storage and retrieval systems at the High School level only and only when required by space limitations.

Portal security systems please see section 17000

11060 Theater and Stage Equipment: Background curtains for platforms and stages are to be black in color.

Media videotape production backdrop curtain to be blue and be of sufficient width to be pleated when in place.

11130 Audio Visual Equipment: Projection screens – manual pull down surface mounted with glass bead surface as directed by the Ed. Spec.

11140 Food Service Equipment: See Equipment list at the end of this section.

Refrigerator/Freezer shall have depressed slab, quarry tile floor w/drain. Compressors on exterior, ground level enclosed with chain link fence enclosure. It is desirable that refrigerant lines be concealed along their entire path.

Kitchen hood ventilation system must meet Washington County Health Department requirements.

Food service domestic hot water requirements must be 180 degrees Fahrenheit and should be provided by a heater located in the food service area.

Kitchen appliances are to be totally electric for all kitchen appliances.

11450 Residential Equipment: The County through F, F&E separate from construction, typically purchases this equipment. The A/E is responsible to locate equipment required by the Ed Spec and to show this equipment as NIC on contract drawings.

11480 Athletic, Recreational and Therapeutic Equipment

DIVISION 12 - Furnishings

Manufactured Casework

Five-ply plywood cores with laminate skin. No Particle Board, MDF or other composite materials will be acceptable.

Adjustable butt hinges with 180 degree swing.

Drawer slides to be stainless steel ball bearing.

Locks to be installed in health room cabinets, teacher wardrobe to be individual lockset.

Instrument Casework – Similar to Wenger.

Window Treatment

Provide 1" aluminum mini-blinds at all windows and as noted in educational specification, interior/exterior windows. Contractor to provide informational pricing with bids.

Furniture & Accessories

Health room cubicle curtain and track shall accommodate 72" health room cots.

DIVISION 13 - Special Construction

13030 Special Purpose Rooms: Block/Drywall partitions with sound deadening insulation shall be provided as directed by the Education Specification.

13120 Pre-Engineered Structures: BOE encourages the use of pre-engineered buildings for tractor storage.

BOE encourages use of pre-engineered canopies if these structures are required by the Education Specification.

13200 Liquid and Gas Storage Tanks: Insure an M.D.E. compliance licensed installer.

If fuel oil tanks are required they shall be above ground and must comply with all Maryland installation requirements. If tanks are utilized they shall be outdoor type with a screen wall around them for aesthetic and security purposes.

DIVISION 14 - Conveying Systems

14200 Elevators: In school settings elevator key locks are to replace call buttons at each floor. All call buttons to be key operated and spring loaded.

Provide conduit for phone line and phone for elevator.

Provide grate on sump pump pit.

Provide a switch in machine room to turn on car lights for maintenance.

Provide GFI outlets in elevator sump pit.

Provide two A.B.C. fire extinguishers to be placed in side elevator machine room.

Provide two duplex outlets required in elevator machine room.

The ladder in elevator pit to is to extend 42" above the pit entry hoistway door.

Elevator manufacturer to be Otis or General

14400 Lifts: Provide call station from wheelchair lift stations to the main office.

DIVISION 15 - Mechanical

Contractors shall be required to startup all systems in an orderly, organized and coordinated manner to ensure that all systems are functioning as designed. The CM or GC will be required to provide a detailed start-up, testing and demonstration plan for all systems in a coordinated manner that is documented in writing at least forty-five (45) days prior to system start-up. Start-up, testing and demonstration plans shall include detailed point-by-point checklists that clearly show that systems are in fact functioning as designed. The A/E shall include modifications to the standard AIA definition of Substantial Completion to indicate that mechanical/electrical systems are not Substantially Complete until all systems are started, tested, balanced and O&M manuals are received by the owner. Above listed items must be completed in time to allow for system demonstrations to BOE personnel with all O&M manuals in hand at the time of demonstration.

Contractors will be required to provide system demonstrations and training for BOE personnel for each system. At minimum contractors will provide eight (8) hours of system demonstration and eight (8) hours of systems operations training for each system prior to BOE acceptance of any given system.

15250 Mechanical Insulation: Provide solid material saddle blocks in all piping system insulation systems where pipe diameter is in excess of 1" diameter.

15300 Fire Protection: Total building is to be fully protected by a sprinkler system.

Provide specific area for housing sprinkler system control components (Preferably in a mechanical space)

Exposed sprinkler pipe to be painted red.

Vacuum breaker or check valve to be installed between cold water and sprinkler system

Provide Ansul type dry chemical system for kitchen hood as per code.

15400 Plumbing Pipe & Fittings: Provide for water filtration at building entry to protect building occupants and equipment from sediment and other harmful particulates that incoming water may contain. Sand filter systems with backwash capability are preferred. The ability to remove particles down to five (5) microns is desired.

Closed loop heating/cooling systems shall have appropriate water treatment to prevent freezing and corrosion.

Provide isolation valves at all equipment along with appropriately placed zone isolation valves.

Any kitchen area drain systems shall have grease interceptor(s) installed outside building with a backwater valve between interceptor and sanitary sewer.

Clean-outs that are on floor level must be shown w/finish plate, not a marker.

Plumbing drain lines shall be zoned to serve sections of building so that a maximum depth does not exceed 5' below finished floor.

All metal piping connections to be threaded, soldered or welded. Exposed piping in unoccupied mechanical spaces may be victolic with welded pipe as an add-alternate.

Provide a master gas shut off at a central location for any school where gas is provided.

Provide acid neutralization systems at lab sinks. Systems shall be local under counter units not central systems.

Plumbing Fixtures: Provide clay traps at all art room sinks.

Provide a single point raw water sampling location for all buildings not served by public water source.

Provide oil separator at all shop locations with adequate service access. (High schools and Career-technology).

15500 Heating, Ventilating and Air Conditioning: BOE requires HVAC systems that are capable of providing heating and air-conditioning systems that can provide year round temperature control. Systems need to be designed with ASHRE regional recommendations in mind. Systems should be designed with 25% redundancy with multiple units that will allow for system operation during maintenance/repairs. Systems shall be designed to building load not unit load capacity. Change over from heating mode to air conditioning mode may be manual in the interest of system installation economy. BOE prefers central air handling units and distribution with VAV reheat and ducted returns. Designs must comply with State of Maryland IAC design guidelines in consideration for system types (three or more, including geo-thermal) and a DGS life cycle analysis.

Heating Systems: Boilers and burners to be dual fuel, natural gas or oil fired modular boilers, wet base with auto sequencing (Hydrotherm, or approved equal). Boilers are to be controlled by Control Systems Inc. building management system, no local controllers.

Provide removable spool piece at breaching for each boiler to provide access for cleaning.

Circulation pumps shall be mounted on concrete house keeping pads.

Circulation pumps should be powered by variable frequency drives with soft start and by-pass capabilities. Allen Bradley VFD's are preferred.

Provide drain lines for all relief valve locations and pipe to nearest floor drain.

All water isolation valves to be ball or butterfly type. Ball type up to 2" butterfly over 2".

Comply with CSD1 requirements without exception.

Comply with NFPA 54 relative to mechanical room ventilation and louver requirements.

Mechanical ventilation is not acceptable unless other options are not available.

Boiler(s) shall be Cast-Iron sectional, external header type. Design shall permit any section to be isolated and heat maintained until convenient to replace. Sections of the double water leg design shall be connected to return drums, outside the combustion area providing vertical setting out of sludge and scale. Supply drums are to be provided with tappings for supply connections, controls and safety valves. Water drum shall have a dip tube and air removal connections to insure air separation. Boiler shall have two cast-iron insulated flue doors in the front sections to permit full access to flue area for cleaning. Doors shall have ceramic rope seals for gas tight fit.

Boilers shall be set on a heavy duty foundation 16" high consisting of cast iron sidewall sections bolted together and steel back end. Erecting bars shall be provided to secure front ends of sidewalls prior to installation of front plate.

The boilers shall be constructed in accordance with the provisions of Section IV of the ASME Boiler and Pressure Vessel Code and shall be stamped with the required official ASME symbol. Each Boiler section shall be hydrostatically pressure tested for 80 PSIG ASME working pressure. H.B. Smith preferred.

Burner and flame failure controller shall be Fireye Flame-Monitor micro processor based burner management controls with message center and self-diagnostics as follows:

Fireye Flame-Monitor E100 with EP160 programmer and the appropriate flame amplifier (EIRI or IEVI) with one for each boiler.

Fireye E300 Expansion Module with a wiring base and ribbon connector cable with one for each boiler.

Fireye E500-3 Communicator Interface and monitor with connectors and ribbon cable adaptor with a baud rate of 2400 BPS on e unit for the two boilers.

Burner Control: The burner shall be arranged for modulating firing of both fuels. A modulating motor controlled by pressure oil valve and the butterfly type gas valve along with the combustion air damper so as to obtain broad range turndown with both fuels. Power Flame preferred.

Air Conditioning/Ventilating Systems: Air or water-cooled Trane chillers are preferred, acceptable manufacturers are Trane, Carrier, or York.

Chillers shall be multiple stage/multiple compressor units. Locations of the chiller or chillers must consider curriculum delivery and should be isolated both physically and mechanically to prevent unnecessary interruptions. Chillers are to be controlled by Control Systems Inc. building management system; no local chiller controllers will be permitted. No R123 refrigerant.

Circulation pumps shall be mounted on concrete house keeping pads.

Circulation pumps should be powered by Allen Bradley variable frequency drives with soft start and by-pass capabilities All filters should have metal frames for a disposable polyester filter media, (not Fiberglass).

Interior mechanical units are to be installed above corridor/storage room ceilings. No major mechanical units to be installed above instructional spaces.

15850 Air Handling: The A/E must select manufacturers that meet all good engineering practice, code requirements and BOE requirements.

The placement of Air handling equipment under roof in penthouses is strongly encouraged.

Roof top Air Handling Units (RTU) are to be designed and constructed for exterior use not converted indoor units. Any RTU is to have external disconnects that are accessible without opening any unit covers.

Any RTU utilized on any project shall include internal pipe chases that do not extend outside of the base curb of the unit. Manufacturers that employ an external pipe chase or doghouse arrangement will not be acceptable to BOE.

If the engineer chooses to include economizer cycles for any RTU that will allow the intake of more than minimum outside air then unit controls should consider the use of enthalpy controls.

VFD controlled air handling is preferred.

The use of Energy Recovery Ventilators is required where appropriate.

Unit design and construction shall eliminate the possibility of stratification. Freeze stats and over pressurization devices shall be provided and monitored by Control Systems Inc.

Demand Control Ventilation is not allowed in classroom wings. It may be considered for use in large assembly spaces.

The use of unit ventilators is strongly discouraged if unit ventilators are used consideration must be given to exterior air quality, or the lack thereof, near units. Louvers shall be connected by duct to the unit ventilator housing, use of building envelope components, as a plenum is not acceptable. Exterior louver locations shall consider landscaping against the building and be placed above possible mulch bed heights.

All air handling equipment shall be controlled from WCBOE energy management systems provided by Control Systems Inc. IA Series Niagara Software is the BOE standard. Microprocessors are not acceptable.

15880 Air Distribution: Comply with SMACNA standards in specifying duct systems.

In consideration of long-term health concerns Fiberglass duct and internal duct lining are not permitted.

Existing and/or new ductwork is to be protected during the construction period and be cleaned, as required, before substantial completion.

Use of sound attenuation devices should be considered particularly for units serving curriculum delivery areas.

Return air ducts shall be provided for all air distribution systems, no ceiling plenums. Use of parallel fan powered VAV units is preferred.

15950 Controls: BOE utilizes Control Systems Inc. management systems. The standard system shall be provided for all schools undergoing system renovation, modernization or new.

During start-up and testing of the Control Systems product the contractor shall perform point by point testing in the presence of BOE personnel.

15990 Testing, Adjusting and Balancing: All testing, Adjusting and balancing is to be completed by a third party agency hired by the CM/GC. The third party agency is to report directly to BOE with copies of reports to the CM/GC. All work must be complete and a typed report provided before subject systems can be found substantially complete. Trades involved in installations of systems shall have them on line at least ninety (90) days before planned substantial completion to allow for Testing, Adjusting and Balancing activities.

DIVISION 16 – Electrical

Contractors shall be required to startup all systems in an orderly, organized and coordinated manner to ensure that all systems are functioning as designed. The CM or GC will be required to provide a detailed start-up, testing and demonstration plan for all systems in a coordinated manner that is documented in writing at least forty-five (45) days prior to system start-up. Start-up, testing and demonstration plans shall include detailed point-by-point checklists that clearly show that systems are in fact functioning as designed. The A/E shall include modifications to the standard AIA definition of Substantial Completion to indicate that mechanical/electrical systems are not Substantially Complete until all systems are started, tested and all O&M manuals are received by the owner. Above listed items must be completed in time to allow for system demonstrations to BOE personnel with O&M manuals in hand at the time of demonstration.

Contractors will be required to provide system demonstrations and training for BOE personnel for each system. At minimum contractors will provide eight (8) hours of system demonstration and eight (8) hours of systems operations training for each system prior to BOE acceptance of any given system.

16210 Electrical Utility Service: The A/E is to coordinate utility service to facilities with the local utility and provide complete and detailed routing for service installations as a part of construction documents.

The A/E shall avoid the use of utility manholes in service installations to keep installations simple and cost effective.

16250 Cable Trays: Provide overhead cable trays in corridors with 100% spare capacity. Provide J-hooks in spaces that lead runs to corridor trays. Telecommunication/Data boxes for outlets shall be a minimum of four inch x four inch (4"X 4") with two (2) one inch (1") conduits up the wall to the ceiling plenum. Raceways between communications closets for fiber shall be conduit and will be run overhead.

16411 Panel boards: All panels feeding telecommunications/data equipment, fire alarm equipment, security system equipment and controls (Johnson) equipment shall be isolated ground and surge protected.

If aluminum feeders are used panel boards shall have appropriate lugs sized for the appropriate aluminum wire size.

16425 Surge Protection System: The main incoming electrical services are to be surge protected.

16430 Motor Starters: Provide phase loss protection for any three (3) phase starters.

All motor starters shall have HOA switches.

All motor starters shall have two (2) sets of auxiliary contacts; control voltage is not to exceed 120V.

All motor starters shall have non-incandescent Indicator lights.

16450 Dry Type Transformers: Transformers are to be provided as required to meet isolated ground requirements set forth in 16411.

Floor mounted transformers, on housekeeping pads, are preferred.

Noise transmission by transformers is to be considered in transformer placement.

16460 Main Switchboard: Aluminum buss bars are acceptable.

Switchboards are to be ground fault protected.

Switchboards are to be mounted on concrete housekeeping pads.

Switchboards should be located outside of main mechanical spaces.

All switchboards shall have non-incandescent Indicator lights.

16511 Basic Wiring Methods:

Conductors & Grounding

The minimum conductor size for power and lighting wiring circuits shall be Number 12 AWG.

All branch services shall have copper wiring.

Aluminum wire may be used for power wiring between the public utility transformer and the main switchboard and/or from the main switchboard to panels only. Aluminum wire may only be used in wire sizes smaller than # 2.

Conduit sizes must be sized for wire specified; larger conduits will be required for any aluminum wire.

Boxes

Comply with NEC in sizing boxes.

Data wiring boxes shall be a minimum of four inch x four inch (4"X4") with two (2) one inch (1") conduits up to the ceiling plenum. Data drops in classrooms, one (1) teacher and five (5) student. Student drops should be grouped to facilitate best use of space. In administrative area offices drops shall be a minimum of two (2) per office located on opposing walls to allow for flexibility in furniture layout.

16521 Wiring Devices: Provide GFI outlets at all wet locations.

16610 Lighting Fixtures: Primary lighting to be provided by four (4) foot fluorescent flush mounted fixtures with electronic ballasts and T8 tubes. Switch inboard/outboard in classrooms. Consult with Board of Education for specific bulb types/manufactures.

Where accent lighting is required or desirable utilize high hats with compact fluorescent tubes.

Exterior building lighting fixtures should also be fluorescent and be provided with protective covers/lenses.

Other types of lighting fixtures are discouraged.

Emergency lighting and minimum night lighting shall be placed on emergency circuits connected to the emergency generator.

16440 Disconnects: Disconnects shall be provided at all hardwired equipment and shall be lockable.

Compliance with CSD1 is mandatory and all boilers and boiler circulating pumps must have disconnects located on or within sight of the equipment.

16620 Emergency Electric Service: Provide an emergency generator as may be required for code required item connection as well as the following:

Heating system including Johnson Controls to avoid freeze-ups
Telephones/Intercoms/Servers
Elevators/Lifts
Walk-in freezers & Refrigerators
Ice-cream freezers
UPS systems in IDF and MDF rooms

16711 Addressable Fire Alarm System:

See Washington County Technology Infrastructure Outline in Division 17.

16735 Security System:

See Washington County Technology Infrastructure Outline in Division 17.

16740 Surveillance System:

See Washington County Technology Infrastructure Outline in Division 17.

16800 Communication Raceways: Underground raceways are discouraged, raceways should be run overhead whenever practical. No communication raceways shall be placed underground except for the phone service and cable TV entrance cables.

Provide overhead cable trays in corridors with 100% spare capacity. Provide J-hooks in spaces that lead runs to corridors. Telecommunication/Data boxes for outlets shall be a minimum of 4"X 4" with two (2) one inch (1") conduits up the wall to the ceiling plenum space. Raceways between communications closets for fiber shall be conduit and will be run overhead. Coordinate location of raceways with other trades to make them accessible for future service.

16810 Communications:

See Washington County Technology Infrastructure Outline in Division 17.

Division 17 - Technology

Drawings and submittals

Drawings: Include a Technology section in drawings that depict all Division 17 technology components. (T-set) Taking particular care for coordinating all trades, these drawings are to show associated devices (power, switches, etc.) in gray scale on the same sheet to aid in coordination.

Ensure submittals from contractors/vendors include floor plans depicting each drop circuit designations, closet designations etc.

Classroom Technology

Typical Classroom

Internet: Five (5) drops
One (1) Teacher Station/Teaching Wall (doubles as VoIP source)
One (1) Network Printer/Student
Three (3) Student
Provide data and power for future wireless installation (Xirrius Wireless)

Phone: VoIP thru Teacher's computer.

Intercom: Two-way Ceiling Speaker, wall mounted handset.

Power: Quad Power outlets (with isolated ground) at each data drop

Clock: Wireless, battery powered Program Clock controlled from central location

Infrastructure for Future Ceiling mounted Projector:

Video Projector Mount

Coordinate/confirm location of projector mounts with owner

Power source:

Data Receptacle above Ceiling (can also be used for future wireless port)

Empty Quad Box at Teaching Wall with 2" conduit to above ceiling for video signal

(video signal wiring will be run from projector to wall box by owner)

Furnishings and Equipment: (by owner)

VoIP Phone Handset

Computer(s)

Printer(s)

LCD Projector

Computer Furniture

Teaching Technology Cart

Document Camera

Video Switch(?)

Alternate Bids:

Additional Data Drops

Data Wiring

CAT-6 wiring (Maybe CAT-6E?)

Wiring home-runs to IDF's and/or MDF (MDF can be located in "Head End Room").

IDF's and MDF linked via fiber optic backbone with 25 pair copper redundancy.

Power in IDF and MDF for UPS backup services and required normal service power.

Spare, empty 3" conduit run between IDF's and MDF for future use

Cabling racks to be open, floor mounted, 19" EIA Std spacing, located at IDF's and MDF

Rack locations to be coordinated and approved by the owner

Data Patch Panels and Cable Management to be supplied by contractor

Data Patch Panels to include 25% spare jacks

100% Spare Rack Space for Owner supplied equipment at each IDF and MDF

Rack maps to be coordinated and approved by owner prior to installation

Supply a Five (5') foot long patch cable for each drop, plus 10% spare

Specify certified installer

All wiring to be tested....supply WCPS with test report.

Furniture and Equipment (by owner)

Server(s)

Hubs, Switches and Routers

Tables

UPS

Alternate Bids:

SOUND SYSTEMS

INTERCOM

Two-Way talk back speakers in all instructional spaces, health, conference, planning, and offices. All other spaces receive paging only.

Speaker Volume Control in offices

Paging zones to be identified in design stage and depicted on drawings

Integrated with independent sound systems in the gym, cafeteria and auditorium.

Emergency ALL CALL to override all independent systems, otherwise local systems take precedence

Intercom rack to be located in Head End Room, with ability to distribute program from an auxiliary input at the rack.

Handsets at administrative offices to allow all paging and intercom functions

Call/Receive Handsets at classrooms...no administrative functions.

System to include Wireless Clocks.

Intercom cabling to be Cat-6

Preferred Mfg: Bogen (thru CommLink)

GYM and CAFETERIA SOUND SYSTEMS

Independent sound systems to be installed in Gym, cafeteria, and auditorium. To include ability to distribute microphone input from various locations in the room(s), as well as programming from auxiliary input(s). In elementary schools, systems are to be tied together, with the Gym system acting as a "slave" to the Cafeteria system so that microphone inputs from the Cafeteria system can be broadcast from both systems during large assemblies. System is to turn on automatically upon connection of microphone at any mic jack. Include CD player and FM radio.

FM Broadcast or Induction Loop system for hearing impaired people in the gym and cafeteria.

Consider monitor speaker for stage.

Install protective cages over all exposed devices.

FIRE ALARM

Provide an addressable fire alarm system that meets all applicable codes and regulations.

Systems must be able to communicate with the current BOE monitoring vendor.

Shop drawings shall identify each device on a floor plan and provide address coding on the drawing at each device location so that systems can be monitored and maintained.

All smoke detection devices shall be non-reactive to dust.

AutoCad As-Built drawings shall be provided in a floor plan format showing each device with its addressable coding address marked at the device location. Half scale prints of this drawing shall be included in O&M manuals. Zone and room/space number shall also provide a list of devices so that monitoring and maintenance personnel can clearly

determine the location of any device.

Vendor: Simplex, Edwards

SECURITY/SURVEILLANCE

Provide video surveillance of parking lots and entrances around the perimeter of building. Cameras can be automated pan type (with tinted eyeball housings) where possible to maximize coverage with the minimum amount of cameras. Coordinate facility lighting with cameras to ensure appropriate lighting for camera use at night. Provide zone drawings for security surveillance equipment.

Provide interior cameras in all major corridors and commons areas.

Camera feeds to be brought to head end in MDF Room with the ability to select and monitor any given camera. All cameras feeds will be multiplexed, and sent to computer based DVR access/storage system. Head end room is to be secure, appropriately ventilated/conditioned and have ample room for supply storage.

School will be locked down at all times, except for main doors at front lobby. Doors near the custodial, kitchen, main corridor, gym entrances etc. will have electronic locks that allow the use of proximity devices to allow them to be unlocked without keys. Consult with WCPS for specific locations for proximity card readers based on actual building layout.

Motion and infrared heat detectors shall be used throughout the school in all lobbies, exterior entrances to corridors, and all corridors. Use of door and/or window contacts is discouraged and are only to be used when no other option is available or practical.

Keypads to disarm the security system to be located at the main entrance(s) , custodial entrance, and kitchen entrance (if this entrance is not adjacent to the custodial entrance). System will allow the option to use proximity cards data to also disarm the system.

Security monitoring devices are to be non-proprietary to allow information from the system to monitored by any company that BOE would choose for monitoring.

Add video call boxes at front entrance and outside entrance to kitchen.

Electronic door opening devices for handicap access must be coordinated with the security system to allow secure handicap access.

Vendor/Supplier contact: Atlantic Security (Contact: Rusty Baker, 301-491-7233)

TELEPHONE

VoIP

Telephones to be a Voice over Internet Protocol (VoIP) system. (Owner supplied and configured)

A discrete VoIP data drop is required at each proposed ADMINISTRATIVE phone location. At classrooms, where "computer phones" are used, the VoIP data will be carried through the single data drop at that location. Wiring requirements are similar to Data wiring.

CAT-6 wiring

Wiring home-runs from each ADMINISTRATIVE phone location to IDF's and/or MDF

Cabling racks to be open, 19" EIA Std spacing, located at IDF's and MDF

Cables carrying only VoIP data are to be run to segregated Patch Panels.

Patch Panels and Cable Management to be supplied by contractor.

VoIP Patch Panels to include 25% spare jacks

100% Spare Rack Space for Owner supplied equipment at each IDF and MDF

Rack maps to be coordinated and approved by owner prior to installation

Supply Five (5') foot long patch cable for each VoIP drop, plus 10% spare

specify certified installer (Same as data wiring installer)

All wiring to be tested - supply WCPS with test report.

Furniture and Equipment

- Server(s)

- Hubs, Switches and Routers

- Tables

- Administrative Phone handsets

- Teacher "computer phone" headsets

Alternate Bids:

CAT-6 wiring in lieu of CAT-5e

OTHER PHONES

Independent standard phone lines (using Cat-6 cable) for the following (at minimum):

- 1 Elevator dial-out
- 2 Fire Alarm dial-out
- 1 Fax/Emergency Phone at Main Office Work room
- 1 Security System dial-out
- ? Other as required by code?