

Appendix "C"
Building Design and Technical Standards



Philadelphia School
Improvement Team

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Volume #1

Building Design Criteria

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Building Design Criteria and Technical Standards

Design Criteria and Technical Standards

This document is organized into two parts: 1) Design Criteria and 2) Technical Standards.

The *Design Criteria and Space Requirements* section addresses some fundamental issues of preferred design practices required for all School District of Philadelphia building design projects, plus design requirements for individual rooms and spaces according to school type.

The *Technical Standards* section addresses detailed requirements and recommendations for the various elements and components of a building and its site.

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Purpose of These Standards

This document, *"Building Design Criteria and Technical Standards"*, is issued as policy of the School District of Philadelphia. It is intended that these standards coordinate the design work for similar and different types of school facilities. Uniformity of materials and techniques of construction is a strong desire of the School District of Philadelphia in order to achieve:

- Consistent design requirements and construction policy among the School District's Capital Programs staff and its consultants
- Uniformity of building maintenance cost issues through standard material purchases and maintenance training
- Reduction of building maintenance problems and building failures by identifying and implementing proven materials and techniques
- Rapid orientation of consultants to the construction and maintenance design objectives desired by the School District
- Management coordination of the content subjects as part of Design Transfer Packages.

These standards are issued as policy of the School District of Philadelphia and must be followed. The standards are formatted for flexibility and choice, permitting designs to reflect individual program requirements and neighborhood contexts.

Any deviation from these standards must be reviewed and approved by the Philadelphia School District's Philadelphia School Improvement Team (PSIT). Any change to these standards must be submitted to the PSIT on a *"Design/Technical Standards Variance Request Form"*. This form will indicate how the variance request differs from the requirements of these Design Standards including its impact on the project cost and schedule. A Variance review committee shall review the request and make its final recommendation and decision regarding its approval or disapproval.

Development of these standards shall be open-ended and on-going. A standing committee, representing various interested departments, meets regularly to receive feedback and to expand and revise the standards.

Your comments and suggestions on how to improve these standards are welcomed.

SUSTAINABLE DESIGN PRACTICES

The School District of Philadelphia endorses, in principle, Sustainable Design considerations. Priority of design on each project shall be meeting the budget, life safety needs, functional use requirements and security needs. Sustainable design principles shall be integrated, to the extent possible, which is achievable while obtaining the prior listed priorities.

- **Sustainable Site Design**
- **Safety and Security**
- **Building Envelope Design**
- **Natural Daylighting**
- **Acoustic Comfort**
- **Indoor Air Quality**
- **High Performance HVAC Design**
- **Water Conservation and Quality**
- **Lighting System Optimization**
- **Building Materials and Resources**
- **Value Engineering**
- **Commissioning**

Sustainable Site Design

Planning Criteria

- Re-use existing buildings and sites wherever possible.
- Consider developing on brownfield sites vs. clearing greenfield sites.
- Consider design and construction of wetlands.
- Consider designing outdoor teaching and interpretive areas.
- Select site that optimizes use of passive solar and natural ventilation
- Consider alternative storm water management technologies.
- Design buildings for flexibility and re-use to curb future developments.

Design Criteria

- Protect and preserve wetlands and other features that are key elements to existing eco-systems.
- Minimize clearing and disturbance of site.
- Minimize building footprint.
- Orient building on east-west axis to maximize solar access.
- Locate building, parking, and driveways to minimize the overall impervious area.
- Use hardy and drought-resistant indigenous plants, trees, and turf.
- Minimize urban heat island effect by using light colored roofs and paving.
- Design landscaping that is compatible with existing plants.
- Consider berming earth against exterior walls where possible.

Safety and Security

Design Criteria

- Design landscaping to minimize places that are hidden from view.
- Ensure that parking, drop-off points, play equipment and entrances are easily observable from inside the building.
- Design exterior lighting to facilitate nighttime surveillance.
- Consider providing views from classrooms into corridors.
- Consider providing views from corridors into stairwells so that upper and lower intermediate landings can be seen.

Building Envelope Design

Design Criteria

- Utilize computer design tools that simulate hourly performance.
- Consider use of Insulating Concrete Forms, (ICF's) in exterior walls: foam-filled CMU with steel reinforced concrete.
- Consider adding thermal mass to temper heat transfer and to increase storage capacity and energy efficiency of exterior wall systems.
- Consider use of Shallow Frost Protected Foundations, (SFPF's): horizontal and/or vertical insulation that protects footing from frost and permits footing depth to be raised.
- Design roof/deck/ceiling system that addresses conduction, radiant gains, and infiltration/exfiltration (radiant barriers).
- Design ground-source heat pump (geo-thermal systems) for HVAC.
- Consider specifying a night purging program.
- Consider using light-colored materials for walls and roofs in order to reflect solar energy.
- Design with passive solar design techniques including exterior shading devices to reduce solar heat gain and reduce glare.
- Minimize east-west windows.
- Design with natural daylighting to reduce building lighting/air conditioning requirements.
- Design a thermally-broken building envelope.
- Design and specify low-e, thermally-broken windows and frames.

Natural Daylighting

Design Criteria

- Integrate and maximize natural daylighting into the building design.
- Conduct and present daylighting simulation during the design process.
- Consider the need to darken certain spaces (TV monitors).
- Minimize sizes and maximize transmission of daylighting apertures.
- Maximize south glazing and properly size shading overhangs.
- Design with recognition that daylight penetration is limited to 15 feet.
- Design roof monitors to evenly distribute light within spaces.
- Utilize light-colored roofing in front of monitors to enhance radiation.
- Utilize translucent baffles to help reduce contrast.
- Avoid direct beam radiation entering spaces. Utilize directional blinds if necessary.
- Design shade at lower vision glass.
- Consider use of external light shelves to reduce direct solar gain and to improve interior penetration of indirect light.
- Design with recognition of shading from adjacent buildings and trees.
- Design with recognition of the light reflectance from adjacent surfaces.
- Provide 10% to 12% glass-to-floor area ratio in classrooms.
- Avoid uncontrolled skylights.

Acoustic Comfort

Design Criteria

- Configure classrooms to damp rather than magnify sound reverberation.
- Specify sound absorbing materials to damp reverberation.
- Design Sound Transmission Class between classrooms and adjacent laboratories at STC-50.
- Design Sound Transmission Class between classrooms and music practice or mechanical equipment rooms at STC-55.
- Avoid placing mechanical equipment rooms next to classrooms, wherever possible.
- Design exterior walls, windows, and roofs so that noise transmission from exterior, (except for intermittent noises), is at same level as background noise inside classroom (RC 30-35).
- Design and specify mechanical equipment to have the following RC levels, based on Room Criterion method according to ASHRAE 1999 Applications Handbook:

Ideal	RC-25N
Acceptable	RC-30N
Maximum	RC-35N

Recognize that sound control is more difficult in un-ducted rooftop or through-wall units than in central air handling systems.

- Design ducted rooftop units with mounting on spring isolators.
- Consider using larger ducts with lower air flow speeds, (1000 feet per minute maximum).
- Specify diffusers with low noise ratings, (NC-20 to NC-23).

Indoor Air Quality

Design Criteria

- Maximize natural ventilation with operable windows.
- Design HVAC system for mixed mode operation.
- Design dedicated engineered ventilation system that operated independently from heating and cooling systems and controls.
- Specify materials that do not off-gas VOCs or other irritants wherever possible.
- Specify adequate time for all installed materials to off-gas before building is occupied. Also, that the ventilation system be continuously operated at the highest possible outside air supply setting for at least 72 hours after all materials and furnishings have been installed.
- Design HVAC system to provide air that delivers air with indoor relative humidity between 30% and 50%.
- Provide user-accessible zone controls wherever possible.
- Specify protection and sealing of HVAC equipment and ductwork during construction.
- Include CO₂ monitoring devices in HVAC system ductwork.
- Locate sources of exhaust fumes from vehicles away from air intakes.
- Specify recessed grates or 'walk-off' mats to reduce the amount of dirt entering the building.

High Performance HVAC Design

Design Criteria

- Utilize energy analysis tools from the outset of design activities.
- Specify high-efficiency HVAC, lighting, and electrical equipment and controls.
- Consider recovery systems that pre-heat or pre-cool incoming ventilation air.
- Consider 'economized cycles' for small package systems.
- Design HVAC systems to control humidity, mean radiant temperature, air velocity, and air temperature for year-round maximum occupant comfort and high energy efficiency.
- Consider standard HVAC sizing safety factors as upper limits.
- Apply any safety factors to a reasonable base condition for the building and not the most extreme or worst-case scenarios.
- Select systems that operate well under part-load conditions.
- Consider integrating building management systems that control HVAC, lighting, outside air ventilation, water heating, and building security.
- Consider individual HVAC controls in each classroom.
- Consider designing drain-back solar collection system, to supplement hot water, to be constructed as student project. Use closed-loop system in larger applications that cannot be drained.
- Consider photovoltaic power systems for applications remote from buildings.
- Consider integrated photovoltaic power systems for applications in buildings.
- Consider advanced solar thermal systems for absorption cooling.
- Design HVAC system to capture heat in exhaust air.

Water Conservation and Quality

Planning Criteria

- Minimize earth-moving, cut, fill, and compaction of soil.
- Preserve and emulate natural hydrological features of the site.
- Design buildings to follow the natural contours of the land instead of carving the land to suit the building.
- Locate buildings and design the site to maximize the use of alternative low impact methods of storm water management.
- Establish a water budget for the building. Set and monitor performance criteria.

Design Criteria

- Design paved parking and play yards with pervious materials or ground recharging catchments.
- Use dry-type retention ponds only as a last choice.
- Specify low-flow toilets that use less than 1.6 gallons per flush.
- Specify urinals that do not exceed 1 gallon per flush or specify water less urinals.
- Consider specification of waterless urinals.
- Specify shower heads that require less than 1.8 gallons per minute.
- Specify aerators to reduce flow in faucets.
- Specify self-closing or electronic faucets to achieve 0.25 gallons per cycle.
- Design a rain water catchment system for site irrigation, toilet flushing, etc. Expose catchment system components to student view.
- Design a grey-water system for flushing toilets and Capturing heat in wastewater.
- Specify soaker hoses and drip irrigation for watering landscape materials.
- Specify timers on watering systems.
- Specify that GC is responsible for water costs during construction
- Specify appropriate times of year for installation of landscape materials to minimize watering requirements.

Lighting System Optimization

Design Criteria

- Develop individual lighting designs for individual room types and spaces.
- Considering electric lighting system as a supplement to natural light.
- Consider controls that provide continuous rather than stepped dimming.
- Consider a mix of direct and indirect light sources for each design.
- Optimize each design so overall lighting levels, (watts per square foot), are as low as possible while providing optimal task illumination.
- Specify T-8 fluorescent lamps with electronic ballasts for most general lighting applications.
- Consider specifying T-5 lamps if justified on a life cycle cost basis.
- Consider dimmable ballasts in rooms that are daylight.
- Design suspended indirect or direct/indirect luminaires in classrooms to provide soft uniform illumination.
- Consider additional accent and directional task lighting for specific uses.
- Consider using smaller number of high efficiency luminaires to light specific spaces.
- Consider scheduled dimming in intermittently occupied spaces.
- Coordinate and integrate lighting design with paint color selections.
- Specify paints with minimum light reflectance value, (LRV) as indicated below:

Gloss white	75%	Medium Orange	42%
Semi-Gloss White	70%	Medium Green	41%
Light Green	53%	Medium Red	20%
Kelly Green	49%	Medium Brown	16%
Medium Blue	49%	Dark Blue-Grey	6%
Medium Yellow	47%	Dark Brown	12%
- Specify high performance light fixtures with polished specular reflectors, energy efficient T-8 and T-5 lamps, in lieu of T-12 lamps.
- Specify high efficiency electronic ballasts in lieu of magnetic ones.
- Specify compact fluorescent lamps in lieu of incandescent.
- Specify continuous dimming or staged lighting control strategies to maximize use of natural light.
- Design indirect lighting to help eliminate glare and contrast.
- Specify LED for exit lights.
- Design lighting controls with daylight sensors combined with occupancy sensors to turn off lights if natural light level is sufficient or if space is unoccupied.

Building Materials and Resources

Design Criteria

- Design with dimensions and modules that optimize use of standard dimensions of construction products and materials.
- Specify construction products, materials, and systems that are engineered for resource efficiency.
- Specify bio-based, recycled content materials wherever possible.
- Select and specify materials with low embodied energy.
- Specify lumber certified to be from managed forests.
- Specify wood preservatives that do not contain arsenic or chromium.
- Prefer products with low or no pollutants.
- Prefer products that utilize recycled materials.
- Prefer products and equipment with low maintenance.
- Specify locally produced materials and components to as great extent as possible.
- Specify salvaged or recycled materials and products wherever possible.
- Evaluate all materials for ability to be recycled at end of useful life.
- Identify and specify regionally manufactured and harvested materials to reduce transportation.
- Do not specify materials or equipment that use CFC or HCFC components.
- Specify materials and components with the lowest levels of volatile organic compounds, (VOC's).
- Specify a construction waste management plan.

Value Engineering

- Use true value engineering techniques, not simply line-item cost reductions.
- Consider all products' life cycle energy costs with regard to raw material extraction, manufacturing, construction, maintenance/use, disposal, and reuse.

Commissioning

Design Criteria

- Provide specification Section 01810, Commissioning with the following objectives:
 1. Ensure that the applicable equipment and systems are installed properly and receive adequate operational checkout by installing contractors.
 2. Verify and document proper performance of equipment and systems.
 3. Ensure that O&M documentation is complete and provided to the Owner in a timely manner.
 4. Ensure that the Owner's operating personnel are adequately trained.
- Specify Commissioning for the following HVAC Sub-Systems, (and all integral controls):
 1. Pumps
 2. Piping, cleaning and flushing
 3. Chemical treatment
 4. Ductwork
 5. Water-to-air heat pumps
 6. Water-to-water heat pumps
 7. Boilers
 8. Testing, Adjusting, and Balancing work
 9. Unit Heaters
 10. Building automation system, (controlled devices, control loops, and system integration).
 11. Geo-thermal systems
- Specify Commissioning for the following Electrical Systems:
 1. Lighting controls
 2. Electrical system power quality
 3. Communication systems
 4. Security system
 5. Emergency power system
 6. Fire alarm system
- Specify Commissioning for the following Plumbing Systems:
 1. Cleaning, flushing, and sterilization of domestic water piping
 2. Domestic hot water heaters
 3. Fire suppression sprinkler system

AMERICANS WITH DISABILITIES ACT REQUIREMENTS

Compliance with the *Americans with Disabilities Act* applies to the design of school facilities, as it applies to students, the teaching staff, and the support staff. Refer to *ADA Accessibility Guidelines for Buildings and Facilities*, and the *International Building Code* for detailed requirements, plus requirements for new construction, additions, alterations, and historic preservation. The following list includes, but is not limited to, the issues to be addressed in schools:

Site Design

- Accessible Site
 - walkways at perimeter of the site
 - widths of routes to buildings
 - stairs
 - slopes of walkways
 - ramps
 - parking spaces and signage
 - passenger loading areas
 - curb ramps
 - crosswalks and signage
 - pavement textures
- Accessible Routes Through Buildings
 - entrance doors
 - corridors and passageways
 - doors
 - stairs
 - elevators
- Accessible Facilities Within Buildings
 - special education spaces
 - assembly areas
 - toilet rooms
 - toilet fixtures
 - toilet compartments
 - urinals
 - lavatories and mirrors
 - bathing rooms
 - bathtubs
 - shower rooms
 - shower stalls
 - drinking fountains and water coolers
 - handrails, grab bars, tub and shower seats
 - controls and operating mechanisms
- Detectable Facilities
 - alarms
 - warnings

**HISTORIC PRESERVATION & RESTORATION REQUIREMENTS
(Div 1)**

The School District of Philadelphia and the Commonwealth of Pennsylvania and Pennsylvania Historical and Museum Commission are in the process of finalizing a Program Agreement that shall govern construction work on buildings that are considered historic and/or are located in an historic district. The following is the current draft of this agreement.

Approved by the SRC
By Resolution # _____
Dated April 21, 2004

PROGRAMMATIC AGREEMENT

Between the School District of Philadelphia, Pennsylvania,
a political subdivision of the Commonwealth of Pennsylvania
and Pennsylvania Historical and Museum Commission

WHEREAS, The School District of Philadelphia has developed a five year Capital Improvement Plan in consultation with the Pennsylvania Department of Education that begins to address critical deficiencies in the condition, and adaptability of public schools in the city of Philadelphia and

WHEREAS the School District of Philadelphia, Pennsylvania (District), now, or in the future may obtain reimbursement from the Pennsylvania Department of Education (Department) for a portion of construction costs: and

WHEREAS the District has determined that the implementation of these programs during the years 2003 – 2010 will affect properties (Properties) included in or eligible for inclusion in the National Register of Historic Places; and

WHEREAS Section 510 of the History Code, Act of May 26, 1988, P.L. 414, No. 72 § 1, 37 Pa. C.S.A. 101 et seq, requires that the Pennsylvania Historical and Museum Commission (PHMC or the Commission) be consulted on the design of any project, building or other undertaking financed in whole or in part by Commonwealth funds which may affect the preservation and development of a property listed on or eligible for the National Register of Historic Places; and

WHEREAS, although under Section 508, the Commission's role is advisory only, the District and Commission desire to set forth procedures whereby such advice of the Commission will be sought within a thirty day time period, unless Commission agrees to reduce the review period to a total of fifteen (15) days (Timelines),

NOW THEREFORE, the District and the Commission agree that projects assisted in the CIP assisted with funds from the Department shall be implemented with the following procedures set forth below, within the requirements of the History Code, to take into account the effect of the CIP on the Properties:

Stipulations:

The District will ensure that the following measures are carried out:

I. Personnel

A. The District will ensure that all historic work carried out pursuant to this Agreement is carried out by or under the direct supervision of a person(s) who meets the required qualifications as defined in 36cfr61.

B. The District will employ George E. Thomas or comparable historian to serve as the consultant. If there is a change in the consultant, the District will notify PHMC.

II. Interim Identification

A. As a part of its planning process the School District will update the Thematic Nomination by fall 2004 for all of the buildings which are a part of the CIP. This updating will prepare the individual entries on buildings that were either left out of the original nomination or have since become eligible because of their architectural or social importance and their age. The new material will include photographs of the buildings and will be deposited with the Bureau for Historic Preservation and will be updated again at the end of the five year plan.

B. Prior to the completion of the updated Thematic Nomination the District's Certified Staff/consultant will provide Pennsylvania Historic Resource surveys on those buildings in the CIP that are eligible or have become eligible for the National Register since the 1988 Thematic Resources nomination of Philadelphia Schools. The original thematic nomination will be reviewed to determine if there have been changes in circumstances that affect the nomination.

III. Activities Not Requiring Review:

A. The following undertakings which have limited potential to affect historic properties may be undertaken without further consultation with PHMC if they are approved by the District consultant:

1. Rehabilitation

a. Exterior

1). Caulking, weather stripping, reglazing of existing sash, and / or repainting.

2). Flat or shallow pitch roof repair / replacement for roofs with a rise to run ratio equal to or less than 3 inches to 12 inches

3). Window repair and / or in kind replacement – "in-kind" is understood to mean new windows that duplicate the dimensions,

design, detail, detailing, and operation of the historic windows.

- a). Repair, scrape, repainting of existing windows
 - b). In-kind replacement of window sash, glass and hardware including jam tracks
 - c). In-kind replacements of damaged and non-operable transoms.
- 4). Storm windows and doors, provided that they conform to the shape and size of the historic windows and doors. The meeting rail of the storm windows must coincide with that of the existing sash. Color should match trim, natural or mill finish aluminum is not acceptable – unless it matches the original window material.
- 5). Security screens attached in a reversible manner and designed to minimize their intrusiveness on the exterior.
- 6). In-kind replacement – (as described above in section 3) is permitted for:
- a). Porches – railings, posts/ columns, brackets, cornices, steps flooring, and other decorative treatments.
 - b). Roofs
 - c). Siding
 - d). Exterior architectural details and features
 - e). Cellar/bulkhead doors
 - f.) Doors.
 - g.) Gutters and downspouts.
- 7). Masonry repair using materials, mortar composition, color, joint profile, and width which matches historic materials.
- 8). Rebuilding of wheel chair ramps.
- 9). In-kind repair or replacement of non-historic features

b. Interior

- 1). Plumbing, rehabilitation,/replacement includes pipes and fixtures when no structural alteration is involved.
- 2). HVAC system rehabilitation/replacement – includes furnaces, pipes, ducts, radiators, or other HVAC units when no structural alteration is involved.

- 3). Electrical wiring – includes switches and receptacles when no structural alteration is involved.
- 4). All interior surface treatments in monumental public spaces such as lobbies, auditoriums and monumental stairs including (floors, walls, ceilings, decorative plaster, woodwork) provided the work is limited to repainting, in-kind patching, refinishing, repapering or laying carpet or vinyl floor materials and that it does not cover character-defining flooring such as marble or terrazzo.
- 5). Interior feature treatments including but not limited to doors, moldings, fireplaces, and mantels provided the work is limited to in-kind repair, patching, repainting and refinishing.
- 6). All other interior surface treatments including but not limited to floors, walls, ceilings, decorative plaster, woodwork provided the work is limited to repainting, in-kind patching, refinishing, or repapering.
- 7). Insulation provided that it is restricted to ceilings and attic spaces.
- 8). Restroom improvements for handicapped access – provided that the work is contained within the existing restroom.
- 9). Repair of or pouring of concrete cellar floor in an existing cellar.
- 10). Technology infrastructure upgrades.

2. Site improvements

- a. In-kind repair or replacement of sidewalks, curbing, driveways, and ramps.
- b. In-kind repair or replacement of site improvements including, but not limited to fences, retaining walls, and landscaping.
- c. Line painting, maintenance, repair, resurfacing, or reconstruction of roads where no change in width, surfaces, or vertical alignment of drainage is to occur.
- d. Repair to or replacement of water, gas, storm, and sewer lines if it occurs in the original trench. Disturbance to either side of the original trench will require consultation with PHMC if there is any potential for disturbance of archaeological sites.

3. Other:

Acquisition – this is understood to mean that any future rehabilitation activities using Department of Education funds covered by this PMOA will be subject to BHP review when a newly acquired property_ is eligible for

B. The rehabilitation, demolition, or construction of any building for which District will not receive any Department funds shall not be subject to this agreement.

IV. Treatment of Historic or Contributing Properties

Individual properties that are eligible for, nominated to, or listed in the National Register, or properties contributing elements within a Historic District will be treated as follows:

A. Rehabilitation

1. Where appropriate as determined by Certified Staff or Consultant in consultation PHMC rehabilitation of historic or contributing properties will be undertaken in accordance with the recommended approaches in The Secretary of Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (Standards) attached hereto as Exhibit A and made a part hereof.

2. Pre-project documentation including description of proposed work, bid documents, architectural plans and photographs will be prepared by the consultant with responsibility for the project and in consultation with the District.

3. If the Standards cannot be met, or if the contemplated action could have a adverse effect on properties listed on or eligible for the National Register, then prior to taking any action, the District will consult with PHMC to seek ways to avoid or mitigate the adverse effect.

a. In those instances where the Standards cannot be met and the District needs to consult with PHMC, the following documentation shall be provided by the District: current photographs and a site location map on U.S.G.S. map; a conditions assessment; an analysis of alternatives with a preferred alternative indicated; a cost analysis of the alternatives and the proposed mitigation measures.

b. PHMC shall provide written comments to the parties identified below within the timelines referenced above following the receipt of documentation. If no comments are received within the Timelines, the District shall assume that PHMC finds the plans to be in conformance with the Standards and may proceed. If PHMC issues comments suggesting changes to the plans, the provisions of Paragraph IX shall be implemented.

B. New Construction and Additions

1. New construction that is subsidized with Department of Education funds and located within an historic district or adjacent to historic properties including in or eligible for the National Register will, insofar as possible, be designed in accordance with the standards for new construction contained within the Standards and be responsive to the overall character of the

historic property in terms of height, scale, massing, set-backs, color, materials, and detailing. Preliminary plans affecting historic resources will be sent to PHMC. PHMC will respond in writing to the District within the specified Timeline following receipt of preliminary plans. If there is no response within the Timeline, the District will assume that PHMC finds the plans in conformance with the Standards and may proceed. . If PHMC issues comments suggesting changes to the plans, the provisions of Paragraph IX shall be implemented.

2. The design of infill construction adjacent to historic properties or properties that have been determined to be eligible for the National Register shall insofar as possible adhere to the Standards and will be developed in consultation with the PHMC. Such designs will be submitted to PHMC on a case-by-case basis. The District will inform PHMC of program requirements, budget constraints, and other factors affecting the design.

3. Additions to historic or contributing buildings within historic districts shall insofar as possible adhere to the Standards and will be consistent with guidelines in National Park Service Preservation Brief 14, " New Exterior Additions to Historic Buildings: Preservation Concerns," attached hereto as Exhibit B and made a part hereof. If the Standards cannot be met, or if the contemplated action could have an adverse effect on properties in the CIP listed on or eligible for the National Register, then prior to taking any action the District will consult with PHMC.

a. In those instances where the Standards cannot be met, and the District needs to consult with PHMC the following documentation shall be provided by the District to PHMC: current photographs and a site location map on a USGS map; a conditions assessment; an analysis of the alternatives with a preferred alternative stated; a cost analysis of the alternatives; and the proposed mitigation measures.

b. PHMC shall provided written comments within the Timelines following receipt of documentation. If there is no response, it shall be deemed PHMC approves the preferred alternative. If PHMC provides comments suggesting changes to the plans, the provisions of Paragraph IX shall be implemented.

C. Handicapped Accessibility

1. The District will explore alternative methods for handicapped accessibility to historic buildings consistent with the Secretary of the Interior's Standards, National Park Service Preservation Brief No. 32 "Making Historic Properties Accessible," and the Department of the Interior's report, "Access to Historic Buildings for the Disabled: Suggestions for Planning and Implementation." As a part of this agreement, PHMC will provide copies of all relevant documents which shall be attached to and incorporated by reference as Exhibits C and D.

2. To the extent feasible, handicapped accessibility features (i.e. ramps and elevators) will not be located on primary elevations of historic buildings and will

not result in the removal of significant historic or architectural features or materials unless there is no demonstrable alternative.

3. Final plans and specifications for handicapped accessibility projects will be reviewed and approved by the Certified Staff / consultant to ensure that projects meet the guidelines. If the Standards cannot be met or if the project would have an adverse effect on a historic property, prior to taking any action, the District will consult with PHMC as follows:

a. In those instances where the Standards cannot be met, and the District needs to consult with PHMC the following documentation shall be provided by the District: current photographs and a site location map on a USGS map; a conditions assessment; an analysis of the alternatives with a preferred alternative stated; a cost analysis of the alternatives; and the proposed mitigation measures.

b. PHMC shall provided written comments within the Timelines following receipt of documentation and if there is no response, it shall be deemed PHMC approves the preferred alternative. If PHMC issues comments suggesting changes to the plans, the provisions of Paragraph IX shall be implemented.

D. Site Improvements and Public Improvements

1. Site improvements and public improvements within historic districts including sidewalk improvements, repaving of streets, installation of landscaping, street lighting, and street furniture insofar as possible shall adhere to the Standards and will be designed to ensure that character defining elements of historic properties are preserved through repair or replacement in-kind. Any new materials or features introduced in a historic district will be responsive to the character of that district.

2. Final plans and specifications for site improvement projects will be reviewed and approved by the Certified Staff / consultant. If the Standards cannot be met or if the project could have an adverse effect on historic properties, then prior to taking any action, the District will consult with PHMC and initiate the procedures set forth in this Agreement.

a. In those instances where the Standards cannot be met, and the District needs to consult with PHMC the following documentation shall be provided by the District: current photographs and a site location map on a USGS map; a conditions assessment; an analysis of the alternatives with a preferred alternative stated; a cost analysis of the alternatives; and the proposed mitigation measures.

b. PHMC shall provided written comments within thirty (30) calendar days following receipt of documentation and if there is no response, it shall be deemed PHMC approves the preferred alternative. If PHMC issues comments suggesting changes to the plans, the provisions of Paragraph IX shall be implemented.

V. Lead Paint Abatement/Hazard Reduction

A. When it is determined that a property listed on, eligible for, or located within a National Register District, must be decontaminated of lead paint hazards, the District will consult with its Certified Staff / consultant to explore alternatives to minimize alteration of significant historic features. Evaluation of abatement and reduction activities shall be based upon the Standards, any district Guidelines for Lead Paint Abatement and the National Park Service Preservation Brief No. 37 which will be appended to this Agreement as Exhibit E.

B. When it is determined that the proposed abatement or reduction plan does not adhere to the Standards, the District will consult with PHMC and request the BHP's determination in accordance with the procedures set forth in this agreement.

1. In those instances where the Standards cannot be met, and the District needs to consult with PHMC, the following documentation shall be provided by the District: current photographs and a site location map on a USGS map; a conditions assessment; an analysis of the alternatives with a preferred alternative stated; a cost analysis of the alternatives; and the proposed mitigation measures.

2. PHMC shall provide written comments within the required response time following receipt of documentation and if there is no response, it shall be deemed PHMC approves the preferred alternative. If PHMC issues comments suggesting changes to the plans, the provisions set forth in Paragraph IX shall be implemented

VI. Demolition

A. Demolition of non-historic or non-contributing buildings. When the School District consultant determines the properties are not of historic consequence, the District may proceed with the demolition of non-historic properties on non-contributing buildings in historic districts without further review by PHMC. The District must retain documentation of all such demolitions in its project files. No demolition may proceed until the Certified Staff /consultant has issued a finding documenting that the properties are non-historic.

B. Emergency Demolition: In the event that the District determines that emergency demolition of a historic property is required to comply with local regulations and to avoid imminent threat to health and safety, the District will forward documentation to PHMC via overnight mail and notification of its intent to apply the emergency review procedure by facsimile with request for comment within seven (7) business days. The documentation will include a copy of the order requiring demolition (declared by a local government's chief executive officer or legislative body, or the agency in charge), photographs of the property, a BHP Resource Form or other documentation establishing the property's eligibility and map location (USGS or city map). PHMC will notify the District in writing of its approval and any required mitigation measures (e.g. recordation, additional photographs, architectural salvage, etc).

C. Non-emergency demolition. Demolition of properties listed on or eligible for listing on the National Register or within a district listed by or eligible for listing on the National Register will be reviewed on a case-by-case basis with PHMC. The District will submit the following documentation for review:

1. Map location (USGS Quadrangle Map and City Map) and description of the property for demolition.
2. Reasons for demolition including documentation of any building code violations and an explanation of why rehabilitation is neither prudent nor feasible.
3. Photographic evidence and written description of the deteriorated conditions or physical conditions that cause the building to be demolished.
4. Photographs of each elevation and any significant architectural elements that exist.

PHMC will review the documentation submitted and will respond within the Timelines. As a part of mitigation, original architectural drawings related to buildings that are demolished or de-accessioned will be turned over to an architectural archive, preferably one connected with a School of Education. If PHMC does not respond within the required Timelines, PHMC shall be deemed to have concurred with the plans and the District shall assume it can proceed. If PHMC issues comments suggesting changes to the plans, the provisions of Paragraph IX shall be implemented.

VII. Archaeological Resources

If any ground disturbing activities are anticipated or planned as a part of an undertaking covered by this Agreement, the District will consult with PHMC to determine if the project area contains known archaeological resources or if there is a high probability that archaeological resources may be present. When archaeological resources are found that meet the National Register Criteria of Eligibility they will be avoided or preserved in place whenever feasible. When it is determined to be infeasible to avoid archaeological resources in place, the District will consult with PHMC to develop a treatment plan consistent with the Council's handbook, Treatment of Archaeological Resources and PHMC Guidelines for Archaeological Investigations (1991). These will be provided to the District by PHMC and will be appended as Exhibit F.

VIII. Monitoring

- A. The District shall retain documentation including description of proposed work and "before" and "after" photographs for all activities carried out pursuant to this Agreement. Files will be retained for a minimum of five (5) years.
- B. An annual report including the addresses of all properties including in Program activities and a description of the work completed at historic properties shall be sent to PHMC for review and comment. Supporting documentation will be provided to PHMC upon written request.

C. Nothing in the Agreement shall be construed as meaning that the District cannot request the advice or assistance of the PHMC at any time.

IX. PHMC Comments or Recommendations

A. Should PHMC issue comments or recommendations within the required Timeline to any plans or specifications pursuant to this Agreement, the District shall consult with PHMC and will take into account any suggestions made by PHMC insofar as possible.

B. Notwithstanding the foregoing, the parties agree that the nature of PHMC's comments are advisory only and that District's determination shall be final. District shall provide PHMC with an explanation of its determination as soon as possible; however, nothing herein shall be construed to permit PHMC to halt or delay the construction or demolition schedule because its comments are contrary to the District's preliminary or final plans.

C. The parties agree to act in good faith at all times under this Paragraph in resolving differences.

X. Termination

Any party to this Programmatic Agreement may terminate it upon providing thirty (30) calendar days notice to the other parties, provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, the District will comply with the requirements of the Pennsylvania History Code as applicable with regard to individual undertakings covered by this Programmatic Agreement.

XI. Notices

Any notices required under this Agreement will be sent by first class mail to the other party as follows:

If to District:

Patrick Henwood, Director
Capital Programs
440 N. Broad Street
Third Floor
Philadelphia, PA 19130
215-400-5190

With copies to Consultant:

George E. Thomas, Ph.D.
Civic Visions LP
2029 Walnut Street
Philadelphia, PA 19103
215-563-1555

Revised December 1, 2005

If to PHMC
R. Ann Safley
Historic Preservation Specialist
Bureau for Historic Preservation
Pennsylvania Historical and Museum Commission
Keystone Building, 2nd floor
400 North Street
Harrisburg, PA 17120-0093

With copies to:

XII. Renewal

This Programmatic Memorandum of Agreement will continue in force through and including December 31 2010, or when the final Department funds have been expended on behalf of the Capital Improvement Program. At the end of calendar year 2008, the Agreement will be reviewed by the District and PHMC for possible modifications, termination, or extension.

Execution and implementation of this Programmatic Agreement is evidence that the District has afforded the Commission an opportunity to comment on its Program and their effects on historic properties, the District has taken into account the effects of its undertakings on historic properties, and that where applicable the District has satisfied its Pennsylvania History code responsibilities for all individual undertakings of the Program.

SCHOOL DISTRICT OF PHILADELPHIA

By: _____ Date: _____
Director of Capital Programs

By: _____ Date: _____
Assistant Secretary

Approved As To Form:

Assistant General Counsel

PENNSYLVANIA BUREAU OF HISTORIC PRESERVATION OFFICER

BY: _____ Date: _____

ES 1.1 Pre-K & Kindergarten Classroom

Technical Standard

FINISHES :

Flooring:

- 60% carpet
- 40% vinyl composition tile
- 4' width in front of cabinets

Base:

- Resilient base

Ceiling:

- Suspended, acoustical

Walls:

- Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards

FEATURES :

Fixed Equipment:

- Open casework – student coats and personal items (no doors)
- 3' of tall wardrobe w/file drawers, optional
- 9' of base & wall cabinets
- 3' sink base cabinet
- 16' of marker board (total)
- 20' of tack board (total)
- Towel dispenser
- 3' of tall cabinets w/tote trays
- Pull Down Projection Screen at Kindergarten only.
- Window shades

Plumbing:

- Sink
- Drinking Fountain
- Plumbing connections
- Fire Protection system

HVAC:

- Supply/return air system
- Independent temperature control

Electrical:

- Fluorescent lighting
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL- Lighting Design
- Multilevel switching
- 1 Quad receptacle @ teaching wall and 3 quad receptacles @ Opposite Wall at Kindergarten only
- 4 Duplex Receptacles
- Central sound system
- Life safety devices per code
- Clock (battery operated solar)
- Sound reinforcement system
- Emergency lighting
- Means of egress
- Lighting per code
- 1 Quad electrical outlet @ Teacher Station at Kindergarten only

Technology

- 1 video port & monitor wall or ceiling mounted
- 1 voice port and phone
- 1 Quad Data @ Teacher Wall and 2 Quad Data @ Opposite Wall at Kindergarten only
- 1 Quad Data @ Teacher Station at Kindergarten only
- Support for ceiling mounted LCD projection system with duplex electrical outlet and duplex data outlet in ceiling at Kindergarten only.

ES 1.1A Pre-K & Kindergarten Toilet Rooms

Technical Standard

FINISHES :

Flooring:

Ceramic mosaic tile or poured epoxy resin

Base:

Ceramic mosaic tile or epoxy resin

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

Fixed Equipment:

Towel dispenser
24" x 30" mirror
Toilet tissue holder
36" and 42" grab bar
Soap dispenser

Plumbing:

Wall-mounted water closet
Wall-mounted lavatory
Plumbing connections
Fire Protection system
Floor Drain

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
1 duplex receptacle
Central sound system
Life safety devices per code

Technology:

N/A

Miscellaneous:

N/A

ES 1.2 Elementary Classroom

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended Acoustical Tile

Walls:

Painted Concrete Masonry Units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards

FEATURES :

Fixed Equipment:

Open casework, student coats w/o doors for

Grades 1-5 only

Provide lockers for grades 6, 7 & 8

3 ft of tall wardrobes with file drawers can support monitor, optional

9 LF of base and wall cabinets

3- ft base cabinet with sink

16 ft of marker board (Total)

20 ft of tackboard (Total)

Window shades

Interactive white board (By owner)

Plumbing:

Sink (First to Fourth Grade Classrooms only)

Plumbing connections

Fire Protection system

HVAC:

Independent temperature control

Electrical:

Multilevel switching

Fluorescent Lighting –

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4- duplex receptacles

1- Quad receptacle @ teaching wall and 3 quad receptacles @ opposite wall

Central sound system

Life safety devices according to code

Clock (battery operable solar)

Sound reinforcement system

1- Quad electrical outlet at Teacher's station

Information Technology:

1- video port and monitor, wall or ceiling mounted

1- voice port and phone

1- Quad data at Teaching Wall and 2 Quad outlets at Opposite Wall

Support for Ceiling Mounted LCD projection system with duplex electrical outlet and duplex data outlet in ceiling

1- Quad data outlet at Teacher's Station.

Miscellaneous:

Operable partitions between classrooms with Tackboard/markerboard surfaces, are permitted on limited basis.

ES 2.1 Technical Education Classroom/Workroom/Storage

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended Acoustical Tile

Walls:

Painted Concrete Masonry Units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards

FEATURES :

3 ft of tall wardrobe with file drawers can support monitor, optional

16 ft of marker board (Total)

20 ft of tack board (Total)

Pencil sharpener support

Add base cabinets required for support of technology stations

Interactive white board (By Owner)

Plumbing:

Fire Protection system

HVAC:

Independent temperature control

Electrical:

Multilevel switching

4 duplex receptacles

1 Quad receptacle @ teaching wall and 3 quad receptacles @ opposite wall

Central sound system

Life safety devices according to code

Clock (battery operable solar)

Fluorescent Lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 Quad Electrical Outlet @ Teacher Station

Information Technology:

1, video port and monitor, wall or ceiling mounted

1, voice port and phone

1 Quad Data @ Teaching Wall and 2 Quad data @ Opposite Wall

Support for Ceiling Mounted LCD projection system with duplex Electrical Outlet and Duplex Data Outlet in Ceiling.

1 Quad Data Outlet at Teacher Station

ES 2.2 **Science Classroom**

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards

FEATURES:

3' of tall wardrobe w/file drawers

(can support monitor, optional)

30' of base sink and wall cabinets (total)

16' of marker board (total)

20' of tack board (total)

Window shades

Towel dispenser

Demonstration table (H.C. accessible) with quad receptacle & Chemical Resistant top

Interactive white boards (By Owner)

Plumbing:

Fire Protection system

Sink in demonstration station, 4 – student use sinks

Plumbing connections

Natural Gas

Compressed Air

(Provide master shut off valve at the teacher's Station for both Natural Gas and Compressed Air)

HVAC:

Independent temperature control

Supply/return air system

Room Exhaust

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL-Lighting Design

Multilevel switching

4 duplex receptacles

Quad receptacles @ teaching wall and 3 quad receptacles @ opposite wall

Central sound system

Life safety devices per code

Clock (battery operable solar)

Sound reinforcement system

1- Quad electrical outlet at Teacher's Station

Technology:

1 video port and monitor

1 voice port and phone

1- Quad data outlet at Teaching Wall and 2 Quad data outlets at Opposite Wall

Support for Ceiling Mounted LCD projection system with duplex electrical outlet and duplex data outlet in ceiling.

1 Quad data outlet at Teacher's Station.

ES 2.3

Vocal Music Classroom

Technical Standard

FINISHES :

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Wall:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

3' of tall wardrobe with file drawers

5' of base cabinets (total)

14' of tall storage cabinets (total)

16' of marker board (total)

16' of tack board (total)

8' of bookcases, 12" deep (total)

3' sink base cabinet

Towel dispenser

Plumbing:

Fire Protection system

Sink

Drinking Fountain

Plumbing connections

HVAC:

Independent temperature control

Supply/return air system

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

4 duplex receptacles

Duplex receptacles adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operable solar)

Emergency lighting

Technology:

1 video port and monitor, wall or ceiling mounted

1, voice port and phone

1, data port near teacher work station

4, data ports, (minimum) for student use

ES 2.4

Art Classroom

Technical Standard

FINISHES :

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards

FEATURES :

3' of tall wardrobe w/file drawers
(can support monitor, optional)
16' of base and wall cabinets (total)
6' of sink base cabinets (total)
16' of chalk board (total)
20' of tack board (total)
Window Shades
Towel dispenser

Plumbing:

Fire Protection system
2 –Sinks
Plumbing connections

HVAC:

Independent temperature control
Supply/return air system

Electrical:

Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Multilevel switching
4 duplex receptacles
Duplex receptacles adjacent to each data and video port
Central sound system
Life safety devices per code
Clock (battery operable solar)
Sound reinforcement system

Technology:

1 video port and monitor, wall or ceiling mounted
1, voice port and phone
1, data port near teacher work station
4, data ports, (minimum) for student use

ES 2.5 Small Group Instructional Classroom (ESL)

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

3' of tall wardrobe w/file drawers
(can support monitor, optional)

3' sink base cabinet

12' of marker board (total)

16' of tack board (total)

Window Shades

Towel dispenser

Interactive white board (By Owner)

Plumbing:

Fire Protection system

Sink

Drinking Fountain

Plumbing connections

HVAC:

Independent temperature control

Supply/return air system

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

4 duplex receptacles

1- Quad receptacle at Teaching Wall and 3 quad
receptacles at Opposite Wall.

1- Quad outlet at Teacher's Station

Central sound system

Life safety devices per code

Clock (battery operable solar)

Sound reinforcement system

Technology:

1- video port and monitor, wall or ceiling mounted

1- voice port and phone

1- Quad data outlet at Teaching Wall and 2 quad data
outlets at Opposite Wall

1- Quad data outlet at Teacher's Station

Support for ceiling mounted LCD projection system
with duplex electrical outlet and duplex data outlet in
ceiling.

ES 3.1 Multiple H.C. Life Skills Support

Technical Standard

FINISHES :

Flooring:

Vinyl Composition tile

Base:

Resilient

Ceiling:

Suspended ceiling tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

Open casework – coats with wall cabinets above
3' of tall wardrobe w/file drawers (can support

Monitor, optional)

6' of base & wall cabinets (total)

3' sink base cabinet

12' of marker board (total)

16' of tack board (total)

Windows shades

Towel dispenser

Interactive white board (By Owner)

Plumbing:

Fire Protection system

Sink

Drinking Fountain

Plumbing connections

Floor Drain

HVAC:

Independent temperature control

Supply/return air system

Electrical:

Multi level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Sound reinforcement system

4 duplex receptacles

Quad receptacles @ teaching wall and 3 quad
receptacles @ opposite wall

Central sound system

Life safety devices per code

Clock (battery operable solar)

1- Quad electrical outlet at Teaching Station

Technology:

1- video port, monitor, wall or ceiling mounted

1- voice port and phone

1- Quad data outlet at Teaching Wall and 2 quad data
outlets at Opposite Wall

1- Quad data outlet at Teacher's Station

Support for ceiling mounted LCD projection system
with duplex electrical outlet and duplex data outlet
in ceiling

<u>Technical Standard</u>	RESTROOM/SHOWER	<u>Specification</u>
<p><u>FINISHES :</u> Flooring: Restroom: Vinyl or rubber sheet flooring Shower: Ceramic mosaic tile</p> <p>Base: Restroom: Resilient Base Shower: Ceramic mosaic tile base</p> <p>Ceiling: Restroom: Suspended, acoustical tile Shower: Painted Portland cement plaster</p> <p>Walls: Epoxy painted concrete masonry units</p> <p>Acoustics: Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards</p>	<p><u>FEATURES :</u> 6’ of base cabinets (total) 24” x 60” mirror Toilet tissue holder 36” and 42” grab bar Soap dispenser Towel dispenser Shower curtain and rod ADA shower accessories</p> <p>Plumbing: Fire Protection system ADA shower controls and head Plumbing connections Wall-mounted water closet Wall-mounted lavatory</p> <p>HVAC: Supplemental heat as required Exhaust heat as required</p> <p>Electrical: Single level switching Fluorescent lighting Illumination level: See Table 8600-10 Section 50-ELECTRICAL – Lighting Design 1 duplex receptacle Central sound system Life safety devices per code</p>	

ES 3.1B

Multiple H.C. Life Skills Support

LOUNGE AREA

Technical Standard

Specification

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

9' of base cabinets (total)

9" of wall cabinets (total)

Kitchenette

Plumbing:

Fire Protection system

Sink

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section 50-ELECTRICAL – Lighting Design

1 duplex receptacle

Central sound system

Life safety devices per code

Duplex receptacle adjacent to each data port

Duplex receptacle for office-type equipment

Technology:

T1 1, voice port and phone

T2 1, data port near workstation

ES 3.2 Special Education Classroom

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Vinyl Base

Ceiling: ACT

Acoustical ceiling

Walls: CMU, Ptd

Concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR

CONSTRUCTION – Acoustical Design Standards

FEATURES:

Open casework – student coats w/o doors with wall cabinets above
3’ of tall wardrobes w/file drawers, can support monitor, optional
9 LF of base & wall cabinets
3’ base cabinet with sink
16’ of marker board (Total)
20’ of tack board (Total)
Towel dispenser
Interactive white board (By Owner)

Plumbing:

Fire Protection system
Sink
Drinking Fountain
Plumbing connections

HVAC:

Independent temperature control

Electrical:

Multilevel switching
4 duplex receptacles
Quad receptacles @ teaching wall and 3 quad receptacles @ opposite wall
Central sound system
Life safety devices per code
Clock (battery operable solar)
Sound reinforcement system
Fluorescent Lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
1- Quad electrical outlet at Teacher’s Station

Information Technology:

1 video port and monitor, wall or ceiling mounted
1, voice port and phone
1- Quad data outlet at Teaching Wall and 2 quad data outlets at Opposite Wall
Support for Ceiling Mounted LCD projection system with duplex electrical outlet and duplex data outlet in ceiling
1- Quad data outlet at Teacher’s station

Miscellaneous:

Operable partitions between classrooms with tackboard/markerboard surfaces, are permitted on a limited basis.

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended Acoustical Tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

2' of tall wardrobe

Plumbing:

Fire Protection system

HVAC:

Independent temperature control

Supply/return air system

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section 50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacles adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operable solar)

Information Technology:

1, voice port and phone

1, data port near work station

ES 3.4 Family Life Management Classroom

Technical Standard

FINISHES :

Flooring:

Vinyl Composition tile

Base:

Resilient

Ceiling:

Suspended ceiling tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

Open casework – coats with wall cabinets above
3' of tall wardrobe w/file drawers (can support

Monitor, optional)

6' of base & wall cabinets (total)

3' sink base cabinet

12' of marker board (total)

16' of tack board (total)

Windows shades

Towel dispenser

Interactive white board (By Owner)

Plumbing:

Fire Protection system

Sink

Drinking Fountain

Plumbing connections

Floor Drain

HVAC:

Independent temperature control

Supply/return air system

Electrical:

Multi level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Sound reinforcement system

4 duplex receptacles

Quad receptacles @ teaching wall and 3 quad
receptacles @ opposite wall

Central sound system

Life safety devices per code

Clock (battery operable solar)

2- Quad electrical outlets at Teacher's station

Technology:

1- video port, monitor, wall or ceiling mounted

1- voice port and phone

1- Quad data outlet at Teaching Wall and 2 quad data
outlets at Opposite Wall

2- Quad data outlets at Teacher's station

Support for ceiling mounted LCD projection system
with duplex electrical outlet and duplex data outlet
in ceiling

Technical Standard

FINISHES :

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

Plumbing:

Fire Protection system

Drinking water cooler, dual level

HVAC:

Independent temperature control

Supply/return air system

Electrical:

Multi level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section 50-ELECTRICAL – Lighting Design

8 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Emergency lighting

Sound system

Student dining sound systems

Means of egress lighting per code

Information Technology:

2, video port, 1 monitor wall mount

2, data ports

Technical Standard

FINISHES :

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

3' sink base cabinet

8' of base and wall cabinets (total)

4' of tack board

Towel dispenser

Plumbing:

Fire Protection system

Plumbing connections

Sink

HVAC:

Independent temperature control

Supply/return air system

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section 50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Receptacles for vending machines, refrigerator,
and microwave

Information Technology:

1, video port, wall or ceiling mounted

1, voice port and phone

4, data ports

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design StandardsFEATURES:

Plumbing:

Fire Protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacles

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Projection Screen

Curtain (back wall) **and side walls**

Plumbing:

Fire Protection system

HVAC:

Supply/return air system

Temperature control with student dining area

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section 50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacles adjacent to each data and
video port

Central sound system

Life safety devices per code

Emergency lighting

Student dining sound system

Means of egress lighting per code

Floor outlets as required

Outlets in face of stage wall

NOTE: This area is intended to be a raised
Platform off of cafetorium.

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

18' – 30' of open metal shelving (total)

84" high

12" deep, 24" deep, or 30" deep

16' – 26' of tall storage cabinets (total)

Plumbing:

Fire Protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacles

Duplex receptacle adjacent to data port

Technical Standard

FINISHES :

Flooring:

- Vinyl composition tile if K-6
- Wood if K-8

Base:

- Resilient

Ceiling:

- Painted exposed structure

Walls:

- Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

- Volleyball sleeves and standards with cart
- Safety wall wainscot
- Basketball backstops, fiberglass, adjustable height

Plumbing:

- Fire Protection system
- Drinking Fountain – Dual Level

HVAC:

- Supply/return air system
- Independent temperature control
- Air Conditioning (to be determined on a case by case basis)

Electrical:

- Single level switching
- High density discharge lighting
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- 8 duplex receptacles
- Duplex receptacle adjacent to each data and video port
- Central sound system
- Life safety devices per code
- Clock (battery operated solar)
- Electrical connections to P.E. eqpt. where necessary
- Means of egress lighting per code
- Gymnasium sound system
- Emergency lighting

Technology

- 2 video ports, 1 monitor with cart
- 2 data ports

Electrical:

- Single level switching

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

18' – 30' of open metal shelving (total)

84" high

12" deep, 24" deep, or 30" deep

16' – 26' of tall storage cabinets (total)

Plumbing:

Fire Protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacles

Duplex receptacle adjacent to data port

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Portland cement plaster

Walls:

Painted concrete masonry units

FEATURES:

Athletic lockers

Locker benches

Plumbing:

Fire Protection system

Drinking fountain – dual level

HVAC:

Exhaust air system

Independent temperature control

Supply air system

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section 50-ELECTRICAL – Lighting Design

2 duplex receptacles

Emergency lighting per code

Means of egress lighting per code

Central sound system

Life safety devices per code

Clock (battery operated solar)

ES 4.9 Physical Education – Student Showers/Toilets

Technical Standard

FINISHES :

Flooring:

- Ceramic mosaic tile in showers
- Poured epoxy in toilet rooms

Base:

- Ceramic mosaic tile in showers
- Resilient base in toilet rooms

Ceiling:

- Painted portland cement plaster

Walls:

- Epoxy - painted concrete masonry units

FEATURES :

- Towel dispensers
- 24" by 30" mirror
- Toilet tissue holders
- 36" and 42" grab bars
- Soap dispensers
- Towel hooks
- Shower curtain and rod
- Toilet partitions
- ADA shower accessories
- 16" x 24" mirror
- Sanitary product dispensers
- Sanitary product receptacles
- Modesty shower partitions

Plumbing:

- Fire Protection system
- Wall-mounted water closets
- Wall-mounted lavatories
- Wall-mounted urinals
- ADA shower controls and head
- Shower fixtures
- Floor Drains

HVAC:

- Supply/return air system
- Exhaust air system

Electrical:

- Fluorescent lighting
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Single level switching
- 4 duplex receptacles
- Emergency lighting
- Means of egress lighting per code
- Central sound system
- Life safety devices per code

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

2’ of tall wardrobe

4’ of tack board

4’ of marker board

Plumbing:

Fire Protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Duplex receptacle adjacent to each data port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near teacher workstation

1 video port

ES 5.1 Instructional Materials Center – Reading/Stacks/Circulation

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units or drywall

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards

FEATURES :

Library book shelving- 15 volumes per enrolled student

15' of circulation desk casework

12' of marker board (total)

16' of tack board (total)

Windows shades

Risers for seating for 30 students

Interactive white board (By Owner)

Plumbing:

Fire Protection system

HVAC:

Supply/return air system

Independent temperature control

Air Conditioning

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section 50-ELECTRICAL – Lighting Design

Multi level switching

6 duplex receptacles

Duplex receptacle adjacent to each data and video port

1 quad receptacle at teaching wall and 3 quad receptacles at opposite wall.

1 quad receptacle electrical outlet at teacher's station.

Central sound system

Life safety devices per code

Clock (battery operated solar)

Emergency lighting

Means of egress lighting per code

Technology:

2 video ports, monitors, wall or ceiling mounted

1 voice port and phone

10 data ports (minimum)

1 data port for library automation system

1 data port at circulation desk

Support for ceiling mounted LCD projection system with duplex electrical outlet and duplex data outlet in ceiling.

1 quad data outlet at teacher's station.

1 quad data outlet at teaching wall and 2 quad data outlets at opposite wall.

ES 5.2 Instructional Materials Center –Library Office/Workroom

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient base

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

9' of work surface with file drawers (total)

4' of marker board

4' of tack board

2' of tall wardrobe

6' of wall cabinets (total)

Interior window

Plumbing:

Fire Protection system

Sink

HVAC:

Supply/return air system

Independent temperature control

Air Conditioning

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port and phone

ES 5.3 Instructional Materials Center – Conference/Seminar Room

Technical Standard

FINISHES :

Flooring:
Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

8' of marker board (total)
8' of tack board (total)
Interactive white board (By Owner)

Plumbing:

Fire Protection system

HVAC:

Supply/return air system
Independent temperature control
Air Conditioning

Electrical:

Fluorescent lighting
Illumination level: See Table 8600-10
Section 50-ELECTRICAL – Lighting Design
Multi level switching
3 duplex receptacles
Duplex receptacle adjacent to each data and
video port
Central sound system
Life safety devices per code
Clock (battery operated solar)
Ceiling mounted project system

Technology:

1 video port, monitor, and brackets
1 voice port and phone
1 data port
Support for ceiling mounted LCD projection
system with duplex electrical outlet and duplex
data outlet in ceiling.

ES 5.4 Instructional Materials Center –AV Room

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

8' – 14' of tall shelving (total),
84" high, 30" deep

6' – 12' of tall shelving (total),
84" high, 24" deep

Plumbing:

Fire Protection system

HVAC:

Exhaust air system

Air Conditioning

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section 50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles (minimum)

ES 5.5 Instructional Materials Center –Teacher Reference Library

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

12' – 15' of base cabinets (total)

8' of tack board (total)

15' – 18' of bookcases (total)

3' sink base cabinet

12' – 15' of wall cabinets (total)

Towel dispenser

Plumbing:

Fire Protection system

Sink

Plumbing connections

HVAC:

Supply/return air system

Independent temperature control

Air Conditioning

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section 50-ELECTRICAL – Lighting Design

Single level switching

3 duplex receptacles (minimum)

Duplex receptacle adjacent to each data port

Central sound system

Life safety devices per code

Clock (battery operated solar)

GFI outlet at sink

Technology:

1 voice port and phone

4 data ports

ES 5.6 Instructional Materials Center – Technology Equipment Room

Technical Standard

FINISHES :

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES :

16' of open metal shelving (total)

84" high,

12" deep or 24" deep

4' of tack board

4' of marker board

Plumbing:

Fire Protection system

HVAC:

Independent, packaged system

Air Conditioning

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section 50-ELECTRICAL – Lighting Design

Single level switching

6 duplex receptacles

Duplex receptacle for electronic systems

Central sound system

Life safety devices per code

Clock (battery operated solar)

Provide distribution eqpt. with an eqpt. electrical ground

Technology:

Rack(s) for voice, video, and data collection and distribution equipment

1 voice port and phone

1 data port near workstation

ES 5.7 Instructional Materials Center – Computer Classroom

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

16' of marker board (total)

16' of tack board (total)

Window shades

Interactive white board (By Owner)

Plumbing:

Fire Protection system

HVAC:

Independent temperature control

Supply/return air system

Air Conditioning

Electrical:

Fluorescent lighting , with parabolic lenses

Illumination level: See Table 8600-10

Section 50-ELECTRICAL – Lighting Design

Multilevel switching

4 duplex receptacles

Duplex receptacle adjacent to each data and
and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port and monitor, wall or ceiling mounted

1 voice port and phone

1 data port near teacher workstation

Classroom area network (32 ports minimum)

1 Quad electrical outlet at Teacher's Station

Support for ceiling mounted LCD projection system
with duplex electrical outlet and duplex data outlet in
ceiling

Technical Standard

FINISHES :

Flooring:

Quarry Tile

Base:

Quarry tile base

Ceiling:

Cleanable, suspended, acoustical tile

Walls:

Epoxy - painted concrete masonry units

FEATURES :

Fixed Equipment:

Food service equipment

Plumbing:

Connections to food service equipment

Fire protection system

Hand sink

HVAC:

Independent temperature control

Supply/return air system

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

Duplex receptacles as required for eqpt.

Central sound system

Life safety devices per code

Clock (battery operated solar)

Connections to food service equipment

Means of egress lighting per code

Duplex receptacle at each cash register

Emergency Lighting

Technology:

Data port(s) at cash register(s)

Technical StandardFINISHES :

Flooring:

Quarry Tile

Base:

Quarry tile

Ceiling:

Cleanable, suspended, acoustical tile

Walls:

Epoxy - painted concrete masonry units

FEATURES :

Fixed Equipment:

Food service equipment

Plumbing:

Connections to food service equipment

Plumbing and gas connections

3 basin sink

Fire protection system

Hand washing lavatory

Grease trap

HVAC:

Independent temperature control

Supply/return air system

Kitchen canopy exhaust system

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

Central sound system

4 duplex receptacles

Life safety devices per code

Emergency lighting

Connections to food service equipment

Clock (battery operated solar)

Means of egress lighting per code

GFI outlets at sink

Technology:

1 voice port and phone

ES 6.2A Food Service - Kitchen (Warming)

Technical Standard

FINISHES:

Flooring:

Quarry Tile

Base:

Quarry tile

Ceiling:

Cleanable, suspended, acoustical tile

Walls:

Epoxy - painted concrete masonry units

FEATURES:

Fixed Equipment:

Food service equipment

Plumbing:

Connections to food service equipment

Plumbing and gas connections

3 basin sink w/ garbage disposal

Fire protection system

Hand washing lavatory

Grease trap

HVAC:

Independent temperature control

Supply/return air system

Kitchen canopy exhaust system

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

Central sound system

4 duplex receptacles

Life safety devices per code

Emergency lighting

Connections to food service equipment

Clock (battery operated solar)

Means of egress lighting per code

GFI outlets at sink

Technology:

1 voice port and phone

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

24" x 60" mirror

Lockers 12" x 8" x 60"

6' of wall cabinets (total)

Mop holder

Plumbing:

Plumbing connections

Fire Protection system

Floor service sink

HVAC:

Exhaust air system

Supplemental heat as required

Dryer vent system

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

1 duplex receptacle

Life safety devices per code

Central sound system

Connections for washer and dryer

ES 6.4 **Food Service – Cook’s Toilets**

Technical Standard

FINISHES :

Flooring:

Ceramic mosaic tile or poured epoxy resin

Base:

Ceramic mosaic tile or epoxy paint

Ceiling:

Suspended, acoustical tile

Walls:

Epoxy painted concrete masonry units

FEATURES :

Fixed Equipment:

Towel dispenser
24” x 30” mirror
Toilet tissue holder
36” and 42” grab bar
Soap dispenser

Plumbing:

Wall-mounted water closet
Wall-mounted lavatory
Plumbing connections
Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Single level switching
1 duplex receptacle
Life safety devices per code
Central sound system

Technical StandardFINISHES :

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design StandardsFEATURES :

Fixed Equipment:

4' of tack board

4' of marker board

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacle

Duplex receptacle adjacent to data and video port

Life safety devices per code

Central sound system

Clock (Battery Operated Solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical Standard

FINISHES :

Flooring:
 Carpet

Base:
 Resilient

Ceiling:
 Suspended, acoustical tile

Walls:
 Painted gypsum wallboard over metal studs

Acoustics:
Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

Fixed Equipment:
 4’ of marker board
 4’ of tack board
 2’ of tall wardrobe

Plumbing:
 Fire protection system

HVAC:
 Supply/return air system
 Independent temperature control

Electrical:
 Fluorescent lighting
 Illumination level: See Table 8600-10
 Section D50-ELECTRICAL - Lighting Design
 Single level switching
 4 duplex receptacle
 Duplex receptacle adjacent to data port
 Life safety devices per code
 Central sound system
 Clock (battery operated solar)

Technology:
 1 voice port and phone
 1 data port near workstation

ES 7.2 Administration – Principal’s Restroom

Technical Standard

FINISHES :

Flooring:

Ceramic mosaic tile or poured epoxy resin

Base:

Ceramic mosaic tile or epoxy paint

Ceiling:

Suspended, acoustical tile

Walls:

Epoxy painted concrete masonry units

FEATURES :

Fixed Equipment:

- Towel dispenser
- 24” x 30” mirror
- Toilet tissue holder
- 36” and 42” grab bar
- Soap dispenser

Plumbing:

- Wall-mounted water closet
- Wall-mounted lavatory
- Plumbing connections
- Fire protection system

HVAC:

- Exhaust air system
- Supplemental heat as required

Electrical:

- Fluorescent lighting
- Illumination level: See Table 8600-10
- Section D50-ELECTRICAL – Lighting Design
- Single level switching
- 1 duplex receptacle
- Central sound system
- Life safety devices per code

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

Fixed Equipment:

Interior windows

4' of Tackboard

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 duplex receptacle

Duplex receptacle adjacent to video port

Central sound system

Life safety devices per code

Means of egress lighting per code

Clock (battery operated solar)

Technology:

1 video port, monitor, and brackets

Technical StandardFINISHES:

Flooring:
Carpet

Base:
Resilient

Ceiling:
Suspended, acoustical tile

Walls:
Painted gypsum wallboard over metal studs

Acoustics:
Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Fixed Equipment:
24' of work surface with file drawers (total)
42" high counter top

Plumbing:
Fire protection system

HVAC:
Supply/return air system
Temperature control with reception area

Electrical:
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Single level switching
3 duplex receptacle
Duplex receptacle adjacent to each data port
Central sound system
Life safety devices per code
Emergency lighting
Clock (battery operated solar)

Technology:
Voice port and phone at each secretarial
workstation
1 fax port
Data port at each secretarial workstation
1 data port for printer

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES :

Fixed Equipment:

4’ of marker board

4’ of tack board

2’ of tall wardrobe

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacle

Duplex receptacle adjacent to data port

Central sound system

Life safety devices per code

Clock (battery operate solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:
Carpet

Base:
Resilient

Ceiling:
Suspended, acoustical tile

Walls:
Painted gypsum wallboard over metal studs

Acoustics:
Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Fixed Equipment:
4’ of marker board
4’ of tack board
2’ of tall wardrobe

Plumbing:
Fire protection system

HVAC:
Supply/return air system
Independent temperature control

Electrical:
Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
4 duplex receptacle
Duplex receptacle adjacent to data port
Central sound system
Life safety devices per code
Clock (battery operated solar)

Technology:
1 voice port and phone
1 data port near workstation

Technical Standard

FINISHES:

Flooring:
Carpet

Base:
Resilient

Ceiling:
Suspended, acoustical tile

Walls:
Painted gypsum wallboard over metal studs

Acoustics:
Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Fixed Equipment:
4' of marker board
4' of tack board
2' of tall wardrobe

Plumbing:
Fire protection system

HVAC:
Supply/return air system
Independent temperature control

Electrical:
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Single level switching
4 duplex receptacles
Duplex receptacle adjacent to data port
Central sound system
Life safety devices per code
Clock (battery operated solar)

Technology:
1 voice port and phone
1 data port near workstation

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design StandardsFEATURES:

Fixed Equipment:

9' of work surface with file drawers (total)

4' of marker board

4' of tack board

2' of tall wardrobe

6' of wall cabinets (total)

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacle

Duplex receptacle adjacent to data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

1 video port

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Fixed Equipment:

10' of base cabinets (total)

12' of tall storage cabinets (total)

3' sink base cabinet

10' of mail cubicles (total)

10' of wall cabinets (total)

Towel dispenser

10' of open base cabinets (total)

Plumbing:

Fire protection system

Sink

Plumbing connections

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

3-5 duplex receptacles

Receptacles for copier

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient base

Ceiling:

Suspended Acoustical Tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

4' of open metal shelving (total),
84" high,
12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Electrical:

Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Single level switching
1 duplex receptacle

Miscellaneous:

Note: This room shall be constructed as a 2 hour fire protected space. This includes all opening assemblies.

Technical Standard

FINISHES:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Fixed Equipment:

8' of marker board (total)

8' of tack board (total)

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

3 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port, monitor, and brackets

1 voice port and phone

1 data port

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

FEATURES:

Fixed Equipment:

19' of open metal shelving (total),
84" high 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Single level switching
1 duplex receptacle

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient base

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Fixed Equipment:

9' of work surface with file drawings (total)

4' of marker board

4' of tack board

2' of tall wardrobe

6' of wall cabinets (total)

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Duplex receptacle adjacent to each data and
video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design StandardsFEATURES:

Fixed Equipment:

4' sink base cabinet

4' of wall cabinets, lockable

Cubicle curtain track

Towel dispenser

4' of tack board

Plumbing:

Fire protection system

Sink

Plumbing connections

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 duplex receptacles

Duplex receptacle adjacent to each data port

Central sound system

Receptacle for refrigerator

Emergency lighting

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

ES 8.3 Clinic/Nurse's Suite – Speech and Hearing Therapy/Psychologist

Technical Standard

FINISHES:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Fixed Equipment:

9' of work surface with file drawings (total)

4' of marker board

4' of tack board

2' of tall wardrobe

6' of wall cabinets (total)

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting design

Single level switching

4 duplex receptacles

Duplex receptacle adjacent to data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port

ES 8.4 Clinic/Nurse's Suite –Toilet Room

Technical Standard

FINISHES:

Flooring:

Ceramic mosaic tile or poured epoxy resin

Base:

Ceramic mosaic tile or epoxy paint

Ceiling:

Suspended, acoustical tile

Walls:

Epoxy painted concrete masonry units

FEATURES:

Fixed Equipment:

Towel dispenser
24' x 30' mirror
Toilet tissue holder
36' and 42' grab bar
Soap dispenser

Plumbing:

Wall-mounted water closet
Wall-mounted lavatory
Plumbing connections
Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Single level switching
1 duplex receptacle
Central sound system
Life safety devices per code

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design StandardsFEATURES:

Fixed Equipment:

Interior windows

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 duplex receptacles

Central sound system

Life safety devices per code

Means of egress lighting per code

Clock (battery operated solar)

Technology:

1 voice port and phone

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Stair Treads:

Refer to tech specs.

Ramp:

Non slip vinyl composition tile.

Vestibules entrances, etc.

Walk-off mats (recessed vinyl)

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

Note: All Corridors shall be as follows:
8'-0" minimum clear.

FEATURES:

Fixed Equipment:

Walk off mats

Fire Extinguishers and cabinets

Plumbing:

Drinking water coolers – Duel Height

Floor drains at water coolers and walk off mats

HVAC:

Supply/return air system

Temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacles

Duplex receptacle adjacent to each video port

Central sound system

Life safety devices per code

Means of egress lighting per code

Emergency lighting

Clocks (battery operated solar)

Technology:

Video ports

Data ports

Pay phone terminal

CCTV cameras

Miscellaneous:

Display cases

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURE:

Open metal shelving (total),

84" high,

12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacles

Life safety devices per code

ES 9.3 Building Support – Building Receiving

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient base

Ceiling:

Painted exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Loading dock leveler and dock bumpers or

Dock lift

Plumbing:

Fire protection system

Floor drain

Hot & Cold Hose Bib w/freeze cocks (at loading dock exterior)

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting

Design

Duplex receptacles

Technology:

CCTV camera

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Painted exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Plumbing:

Fire protection system

Floor drain

Hose Bib

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacles

ES 9.5 Building Support Facilities – Dispersed Storage Room

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment

10' – 16' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Duplex receptacles
Life safety devices per code

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Fixed Equipment

4' of marker board

4' of tack board

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 Duplex receptacles

Duplex receptacle adjacent to data port

Central sound system

Life safety devices per code

Clocks (battery operated solar)

Technology:

Data port for temperature controls computer
(tie into building data system)

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

None

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment

16' – 24' of open metal shelving (total),
84" high,
12" deep, 24" deep, or 30" deep
4-6 lockers
Mop holder

Plumbing:

Fire protection system
Floor service sink
Floor drain

HVAC:

Supply/return air system
Independent temperature control
Exhaust system

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
4 Duplex receptacles (minimum)
Electrical receptacles for custodial equipment
Central sound system
Life safety devices per code
Clocks (battery operated solar)

Technology:

1 voice port and phone

Technical Standard

FINISHES¹:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

(optional)

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment

Data racks

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 Duplex receptacle

Receptacles for data equipment

Technology:

Technology equipment

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Cleanable, suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment

Mop holder

Open shelving

Plumbing:

Mop receptor

Plumbing connections

Fire protection system

HVAC:

Exhaust air system

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 Duplex receptacles

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

None

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment

To be determined by Design Professional

Plumbing:

To be determined by Design Professional

Floor drains

Hose bib

HVAC:

To be determined by Design Professional

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Others as determined by Design Professional

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient base

Ceiling:

(optional)

Walls:

Painted concrete masonry units

FEATURES:

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

E1 Electrical panels

Electrical step down transformers

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment

To be determined by Design Professional

Plumbing:

To be determined by Design Professional

HVAC:

To be determined by Design Professional

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Others as determined by Design Professional

Technical Standard

FINISHES:

Flooring:

Sealed concrete
W.P. membrane on floors above other building spaces for rooms with pumps, boilers and units with heating and cooling coils.

Base:

None

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment

To be determined by Design Professional

Plumbing:

To be determined by Design Professional

Floor drains

Hose bib

HVAC:

To be determined by Design Professional

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Others as determined by Design Professional

ES 9.14 Building Support – Public/Student Toilet Facilities

Technical Standard

FINISHES :

Flooring:

Ceramic mosaic tile or poured epoxy resin

Base:

Ceramic mosaic tile base or epoxy paint

Ceiling:

Suspended FRP, acoustical system

Walls:

Epoxy painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

Provide minimum of one ADA toilet stall. Provide one Modified ADA stall for every 5 water closets exceeding 5 water closets.

FEATURES :

Fixed Equipment

Towel dispensers
24" x 30" mirror
Toilet tissue holders
36" and 42" grab bar
Soap dispensers
Toilet partitions
Sanitary product dispenser
Sanitary product receptacles
16" x 24" mirrors
Provide coat hook on all doors

Plumbing:

Wall-mounted water closets
Wall-mounted urinals (consider **waterless**)
Wall-mounted lavatories
Wall hydrants
Plumbing connections
Fire protection system
Floor drains

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
1 duplex receptacle
Central sound system
Emergency lighting
Life safety devices per code

ES 9.15 Building Support – Teaching/Staff Toilet Facilities

Technical Standard

FINISHES :

Flooring:

Ceramic mosaic tile or poured epoxy resin

Base:

Ceramic mosaic tile or epoxy paint

Ceiling:

Suspended, acoustical tile

Walls:

Epoxy painted concrete masonry units

FEATURES :

Fixed Equipment

Towel dispensers

24" x 30" mirror

Toilet tissue holders

36" and 42" grab bar

Soap dispensers

Provide Coat Hooks on inside of Door

Plumbing:

Wall-mounted water closets

Wall-mounted lavatory

Plumbing connections

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Central sound system

Life safety devices per code

HS 1.1 **9th Grade Classroom**

Technical Standard

FINISHES :

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Ptd

Stud & impact board (non corridor walls)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

3' of tall wardrobe with file drawers

Option: supports monitor

12' computer work surface

16' of marker board

16' of tackboard

Window shades

Interactive white board (By Owner)

HVAC:

Independent temperature control

Plumbing:

Fire protection system (when required by code)

Electrical:

Multilevel switching

4 duplex receptacles

Fluorescent Lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1- Quad receptacles @ teaching wall and 3 quad
receptacles @ opposite wall

1- Quad receptacle at Teacher's station

Central sound system

Life safety devices according to code

Clock (battery operated solar)

Emergency lighting

Means of egress lighting by code

Information Technology:

1, video port and monitor

1, voice port and phone

1- Quad data outlet at Teaching Wall and 2 quad
data outlets at Opposite Wall

1- Quad data outlet at Teacher's Station

Support for Ceiling Mounted LCD projection
system with duplex electrical outlet and duplex
data outlet in ceiling

Miscellaneous:

Operable partitions between classrooms are
optional. For limited use.

HS 1.1A **10th-12th Grade General Classroom**

Technical Standard

FINISHES :

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Ptd

Stud & impact board (non corridor walls)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

3' of tall wardrobe with file drawers

Option: supports monitor

12' computer work surface

16' of marker board

16' of tackboard

Window shades

Interactive white board (By Owner)

HVAC:

Independent temperature control

Plumbing:

Fire protection system (when required by code)

Electrical:

Multilevel switching

Fluorescent Lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

1- Quad receptacle at Teaching Wall and 3 quad
receptacles @ Opposite Wall

Central sound system

Life safety devices according to code

Clock (battery operated solar)

1- Quad electrical outlet at Teacher's Station

Emergency lighting

Means of egress lighting by code

Information Technology:

1, video port and monitor

1, voice port and phone

1- Quad data outlet at Teaching Wall and 2 quad
data outlets at Opposite Wall

1- Quad data outlet at Teacher's Station

Support for Ceiling Mounted LCD projection
system with duplex electrical and duplex data
in ceiling

Miscellaneous:

Operable partitions between classrooms are
optional. For limited use.

HS 1.2 **9th Grade Science Classroom**

Technical Standard

FINISHES :

Floor:

Poured Epoxy

Base:

Resilient

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Ptd

Stud & impact board (non corridor walls)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

Information Technology:

- 1 video port and monitor
- 1 voice port and phone
- 1 data port at demonstration table
- 8 data ports, (minimum) for student use
- 1- Quad data outlet at Teacher's Station
- Support for ceiling mounted LCD projection system with duplex electrical outlet and duplex data outlet in ceiling

FEATURES :

Fixed Equipment:

- 3' of tall wardrobe with file drawers
- Demonstration table (ADA Accessible) with chemical resistant top.
- Teacher's Desk
- 8' of marker board
- 12' of tackboard
- 56' of perimeter of sink base cabinets
- Emergency shower eye-wash
- 6' of wall cabinets
- 4, 3-foot wall cabinets, lockable
- 5, towel dispensers
- 2, eye hooks for demonstrations
- 1, fume hood
- Window shades
- Interactive white board (By Owner)

HVAC:

- Independent temperature control
- Manually operated exhaust fan
- Exhaust for fume hood

Plumbing:

- Fire extinguisher
- Fire protection system (when required by code)
- Plumbing connections
- Emergency shower/eye-wash connections
- Master shut-off for gas & compressed air at teacher's station
- Gas and compressed air connections
- Acid tank
- 8 lab sinks & 1 H.C. lab sink,
- 1 dissecting sink

Electrical:

- Multilevel light switching
- Fluorescent Lighting:
 - Illumination Level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Duplex receptacles at perimeter workstations and teaching wall
- Duplex receptacle adjacent to each data and video port
- 1- Quad electrical outlet at Teacher's Station
- Central sound system
- Life safety devices according to code
- Clock (battery operated solar)
- Emergency lighting
- Means of egress lighting according to code
- GFI outlets at sink locations

HS 1.2A **10th – 12th Grade Science Classroom**

Technical Standard

FINISHES :

Floor:

Poured Epoxy

Base:

Resilient

Ceiling:

Suspended Acoustical Tile

Walls:

Painted CMU

Stud & impact board (non corridor walls)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

Information Technology:

1 video port and monitor
1 voice port and phone
1 data port at demonstration table
8 data ports (minimum) for student use
1- Quad data outlet at Teacher's Station
Support for ceiling mounted LCD projection
system with duplex electrical and duplex data outlet in
ceiling.

FEATURES :

Fixed Equipment:

3' of tall wardrobe with file drawers
Demonstration table (ADA Accessible)
with chemical resistant top.
Teacher's Desk
8' of marker board
12' of tackboard
56' of perimeter of sink base cabinets
Emergency shower eye-wash
6' of wall cabinets
4, 3-foot wall cabinets, lockable
5, towel dispensers
2, eye hooks for demonstrations
1, fume hood
Window shades
Interactive white board (By Owner)

HVAC:

Independent temperature control
Manually operated exhaust fan
Exhaust for fume hood

Plumbing:

Fire extinguisher
Fire protection system (when required by code)
Plumbing connections
Emergency shower/eye-wash connections
Master shut-off for gas and compressed air at
teacher's station.
Gas and compressed air connections
Acid tank
8 lab sinks & 1 H.C lab sink, 1 dissecting sink

Electrical:

Multilevel light switching
Duplex receptacles at perimeter workstations
and teaching wall
Duplex receptacle adjacent to each data and
video port
1- Quad electrical outlet at Teacher's Station
Central sound system
Life safety devices according to code
Clock (battery operated solar)
Emergency lighting
Means of egress lighting according to code
Fluorescent Lighting:
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
GFI outlets at sink locations

HS 1.3 **9th Grade Science Prep/Storage**

Technical Standard

FINISHES:

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Ptd

Stud & impact board (non corridor)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

- 8' of tackboard
- 15' of lab station with sink
- Drying racks with pegs
- Towel dispenser
- 12 lin ft of wall cabinets
- 2, 3-ft acid storage cabinets (ventilated)
- 3 ft of storage cabinets for flammables
- 16' of tall storage cabinets
- 1, fume hood
- 1, emergency eye-wash/shower
- Quick access to Science CR

HVAC:

- Independent temperature control
- Manual exhaust
- 24-hr exhaust for acid storage cabinets

Plumbing:

- Fire protection system
- Plumbing connections
- Acid waste system
- Gas and compressed air connections
- Fire extinguisher
- 1 Lab sink

Electrical:

- Single level switching
- Fluorescent Lighting:
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- 1, duplex receptacle under each work table
- 3, duplex receptacles, minimum, at perimeter walls
- Duplex receptacle adjacent to each data and Central sound system
- Life safety devices according to code
- Clock (battery operated solar)
- Receptacle for refrigerator/freezer
- Duplex receptacle at each data and video port
- GFI outlets at sink locations

Information Technology:

- 1 voice port and phone
- 1 data port

HS 1.3A **10th – 12th Grade Science Prep/Storage**

Technical Standard

FINISHES :

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended, Acoustical Tile

Walls:

CMU, Ptd

Stud & impact board (non corridor)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

- 8' of tackboard
- 15' of lab station with sink
- Drying racks with pegs
- Towel dispenser
- 12 lin ft of wall cabinets
- 2, 3-ft acid storage cabinets (ventilated)
- 3 ft of storage cabinets for flammables
- 16' of tall storage cabinets
- 1, fume hood
- 1, emergency eye-wash/shower
- Quick access to Science CR

HVAC:

- Independent temperature control
- Manual exhaust
- 24-hr exhaust for acid storage cabinets

Plumbing:

- Fire protection system
- Plumbing connections
- Acid waste system
- Gas and compressed air connections
- Fire extinguisher
- 1 Lab sink

Electrical:

- Single level switching
- Fluorescent Lighting:
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- 1, duplex receptacle under each work table
- 3, duplex receptacles, minimum, at perimeter walls
- Duplex receptacle adjacent to each data and
- Central sound system
- Life safety devices according to code
- Clock (battery operated solar)
- Receptacle for refrigerator/freezer
- Duplex receptacle at each data and video port
- D 50- Electrical
- GFI outlets at sink locations

Information Technology:

- 1 voice port and phone
- 1 data port

HS 1.4 9th Grade Special Education Classroom

Technical Standard

FINISHES :

Floor:

Vinyl Composition tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU Ptd

Stud & impact board (non corridor)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

Open casework for coats

3' of tall wardrobe, with drawers

16' of marker board

16' of tackboard

12' computer work surface

Towel dispenser

Window shades

Interactive white board (By Owner)

HVAC:

Independent temperature control

Plumbing:

ADA sink with drinking fountain

Plumbing connections

Fire protection system

Electrical:

Multilevel light switching

Fluorescent Lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

1- Quad receptacle @ teaching wall and 3 quad
receptacles @ opposite wall

1- Quad electrical outlet at Teacher's Station

Central sound system

Life safety devices according to code

Clock (battery operated solar)

GFI outlet at sink

Emergency lighting

Means of egress lighting according to code

Information Technology:

1 video port and monitor

1 voice port and phone

1- Quad data outlet at Teaching Wall and 2 quad
data outlets at Opposite Wall

1- Quad data outlet at Teacher's Station

Support for Ceiling Mounted LCD projection
system with duplex electrical outlet and duplex
data outlet in ceiling

HS 1.4A **10th – 12th Grade Special Education Classroom**

Technical Standard

FINISHES :

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical tile

Walls:

CMU Painted

Stud & impact board (non corridor)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

Open casework for coats
3' of tall wardrobe, with drawers
16' of marker board
16' of tack board
12' computer work surface
Towel dispenser
Window shades
Interactive white board (By Owner)

HVAC:

Independent temperature control

Plumbing:

ADA sink with drinking fountain
Plumbing connections
Fire protection system

Electrical:

Multilevel switching
Fluorescent Lighting:
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
4, duplex receptacles
1- Quad receptacles @ teaching wall and 3 quad
receptacles @ opposite wall
Central sound system
Life safety devices according to code
Clock (battery operated solar)
GFI outlet at sink
Emergency lighting
Means of egress lighting according to code
1- Quad electrical outlet at Teacher's Station

Information Technology:

1- video port and monitor
1- voice port and phone
1- Quad data outlet at Teaching Wall and quad
electrical outlet at Opposite Wall
Support for Ceiling Mounted LCD projection
system with duplex electrical outlet and duplex
data outlet in ceiling

HS 1.5 9th Grade Special Education Restroom/Shower

<u>Technical Standard</u>	RESTROOM/SHOWER	<u>Specification</u>
<p><u>FINISHES:</u> Flooring: Restroom: Vinyl or rubber sheet flooring Shower: Ceramic mosaic tile</p> <p>Base: Restroom: Resilient Base Shower: Ceramic mosaic tile base</p> <p>Ceiling: Restroom: Suspended, acoustical tile Shower: Painted Portland cement plaster</p> <p>Walls: Epoxy painted concrete masonry units</p> <p>Acoustics: Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards</p>	<p><u>FEATURES:</u> 6' of base cabinets (total) 24" x 60" mirror Toilet tissue holder 36" and 42" grab bar Soap dispenser Towel dispenser Shower curtain and rod ADA shower accessories</p> <p>Plumbing: Fire Protection system ADA shower controls and head Plumbing connections Wall-mounted water closet Wall-mounted lavatory</p> <p>HVAC: Supplemental heat as required Exhaust heat as required</p> <p>Electrical: Single level switching Fluorescent lighting Illumination level: See Table 8600-10 Section 50-ELECTRICAL – Lighting Design 1 duplex receptacle Central sound system Life safety devices per code</p>	

Technical Standard

FINISHES :

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Painted

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

Open metal shelving,
30 lf x 84”h x 12”, 24”, or 30”d
9’ of base & wall cabinets (total)
3’ of tall wardrobe
16’ tackboard
16’ markerboard
Towel Dispenser

HVAC:

Exhaust air system
Supplemental heat as required

Plumbing:

Sink
Plumbing connections
Fire protection system
Fire extinguisher

Electrical:

Single level switching
4 duplex receptacles
Fluorescent Lighting:
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Emergency lighting
Means of egress by code
Clock (battery operated solar)
GFI outlet at sink
Means of egress lighting according to code
Central sound system

HS 1.5B 10th – 12th Grade Special Education Life Skills Lab

Technical Standard

FINISHES :

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU Painted

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

3' of tall wardrobe, with drawers

9' of base and wall cabinets

3-ft base cabinet with sink

16' of marker board

16' of tack board

Towel dispenser

Operable partition

Window shades

Interactive white board (By Owner)

HVAC:

Independent temperature control

Plumbing:

Sink

Plumbing connections

Fire protection system

Electrical:

Multilevel switching

Fluorescent Lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4, duplex receptacles

1- Quad receptacle at Teaching Wall and 3 quad
receptacles at Opposite Wall

Central sound system

Life safety devices according to code

Clock (battery operated solar)

Means of egress lighting by code

GFI outlet at sinks

Emergency lighting

1- Quad electrical outlet at Teacher's Station

Information Technology:

1 video port and monitor

1 voice port and phone

1- Quad data outlet at Teaching Wall and 2 quad
data outlets at Opposite Wall

1- Quad data outlet at Teacher's Station

Support for Ceiling Mounted LCD projection
system with duplex electrical outlet and duplex
data outlet in ceiling

HS 1.5C 10th-12th Grade Special Education Restroom/Shower

<u>Technical Standard</u>	RESTROOM/SHOWER	<u>Specification</u>
<p>FINISHES :</p> <p>Flooring: Restroom: Vinyl or rubber sheet flooring Shower: Ceramic mosaic tile</p> <p>Base: Restroom: Resilient Base Shower: Ceramic mosaic tile base</p> <p>Ceiling: Restroom: Suspended, acoustical tile Shower: Painted Portland cement plaster</p> <p>Walls: Epoxy painted concrete masonry units</p> <p>Acoustics: Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards</p>	<p>FEATURES :</p> <p>6' of base cabinets (total) 24" x 60" mirror Toilet tissue holder 36" and 42" grab bar Soap dispenser Towel dispenser Shower curtain and rod ADA shower accessories</p> <p>Plumbing: Fire Protection system ADA shower controls and head Plumbing connections Wall-mounted water closet Wall-mounted lavatory</p> <p>HVAC: Supplemental heat as required Exhaust heat as required</p> <p>Electrical: Single level switching Fluorescent lighting Illumination level: See Table 8600-10 Section 50-ELECTRICAL – Lighting Design 1 duplex receptacle Central sound system Life safety devices per code</p>	

HS 1.5D 10th – 12th Grade Special Education Lounge Area

LOUNGE AREA

Technical Standard

Specification

FINISHES:

Flooring:
 Vinyl Composition Tile

Base:
 Resilient

Ceiling:
 Suspended, acoustical tile

Walls:
 Painted concrete masonry units

Acoustics:
Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

9' of base cabinets (total)
9" of wall cabinets (total)
Kitchenette

Plumbing:
 Fire Protection system
 Sink

HVAC:
 Supply/return air system
 Independent temperature control

Electrical:
 Single level switching
 Fluorescent lighting
 Illumination level: See Table 8600-10
 Section 50-ELECTRICAL – Lighting Design
 1 duplex receptacle
 Central sound system
 Life safety devices per code
 Duplex receptacle adjacent to each data port
 Duplex receptacle for office-type equipment

Technology:
T1 1, voice port and phone
T2 1, data port near workstation

HS 1.6 9th Grade Special Education Lounge Area

LOUNGE AREA

Technical Standard

Specification

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

9' of base cabinets (total)

9" of wall cabinets (total)

Kitchenette

Plumbing:

Fire Protection system

Sink

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section 50-ELECTRICAL – Lighting Design

1 duplex receptacle

Central sound system

Life safety devices per code

Duplex receptacle adjacent to each data port

Duplex receptacle for office-type equipment

Technology:

T1 1, voice port and phone

T2 1, data port near workstation

HS 1.6A **10th - 12th Grade Computer/Flex Lab**

Technical Standard

FINISHES :

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Painted

Acoustics:

Refer to Technical Standards, C10-INTERIOR

CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

3' of tall wardrobe with file drawers

Option: supports monitor

12' computer work surface

16' of marker board

16' of tackboard

Window shades

Interactive white board (By Owner)

HVAC:

Independent Temperature Control

Air Conditioning

Plumbing:

Fire protection system

Electrical:

Emergency lighting

Means of egress by code

Clock (battery operated solar)

Fluorescent Lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1- Quad receptacle at Teaching Wall and 3 quad receptacles at Opposite Wall

2- Quad electrical outlets at Teacher's Station

Information Technology:

1- video port and monitor

1- voice port and phone

2- Quad data outlets at Teaching Wall and 2 quad data outlets at Opposite Wall

1- Quad data outlet at Teacher's Station

Support for Ceiling Mounted LCD projection system with duplex electrical and duplex data outlets in ceiling

HS 1.7 **9th Grade Special Education Resource Room**

Technical Standard

FINISHES :

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Ptd

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

Open metal shelving,
30 lf x 84”h x 12”, 24”, or 30”d
9’ of base & wall cabinets (total)
3’ of tall wardrobe
16’ tackboard
16’ markerboard
Towel Dispenser

HVAC:

Exhaust air system

Plumbing:

Sink
Plumbing connections
Fire protection system
Fire extinguisher

Electrical:

Single level switching
4 duplex receptacles
Fluorescent Lighting:
 Illumination level: See Table 8600-10
 Section D50-ELECTRICAL – Lighting Design
Emergency lighting
Means of egress by code
Clock (battery operated solar)
Central Sound System
GFI outlet at sink
Means of egress lighting according to code

HS 1.7A **10th-12th Grade Multi-Purpose Classroom**

Technical Standard

FINISHES :

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Painted

Stud & impact board (non corridor walls)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

3' of tall wardrobe with file drawers

Option: supports monitor

12' computer work surface

16' of marker board

16' of tack board

Window shades

Interactive white board (By Owner)

HVAC:

Independent temperature control

Plumbing:

Fire protection system (when required by code)

Electrical:

Multilevel switching

4 duplex receptacles

1- Quad receptacles @ teaching wall and 3 quad
receptacles @ opposite wall

Central sound system

Life safety devices according to code

Clock (battery operated solar)

Fluorescent Lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Emergency lighting

Means of egress lighting by code

1- Quad electrical outlet at Teacher's Station

Information Technology:

1- video port and monitor

1- voice port and phone

2- Quad data outlets at Teaching Wall and 2 quad
data outlets at Opposite Wall

1- Quad data outlet at Teacher's Station

Support for Ceiling Mounted LCD Projection
System with Duplex Electrical Outlet and
Duplex Data Outlet in Ceiling.

Miscellaneous:

Operable partitions between classrooms are
optional. For limited use.

HS 1.7B **10th – 12th Grade Foreign Language Lab**

Technical Standard

FINISHES :

Flooring:

- Vinyl composition tile
 4' width in front of cabinets
- Carpet

Base:

- Resilient

Ceiling:

- Suspended, acoustical tile

Walls:

- Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

- 3' of tall wardrobe with file drawers
- 16' of marker board (total)
- 3' sink base cabinets (total)
- 9' of wall cabinets (total)
- 6' of base cabinets with heavy duty
 counter top (total)
- 8' of tack board (total)
- Towel dispenser
- Interactive white board (By Owner)

Plumbing:

- Fire protection system
- Sink, 12" deep
- Plumbing connections

HVAC:

- Supply/return air system
- Individual temperature controls

Electrical:

- Fluorescent lighting with parabolic lenses:
 Illumination level: See Table 8600-10
 Section D50-ELECTRICAL – Lighting Design
- Multilevel switching
- 4 duplex receptacles
- Duplex receptacle adjacent to data and
 video port
- Emergency lighting per code
- Means of egress lighting per code
- Central sound system
- Life safety devices per code
- Clock (battery, solar)
- Receptacle for printer
- GFI outlets at sink
- 1-Quad electrical outlet at Teacher's Station
- 1- Quad electrical outlet at Teaching Wall and 3
quad electrical outlets at Opposite Wall

Technology:

- 1 video port, monitor, with cart
- 1 voice port and phone
- Classroom area network
 (25 data ports minimum)
- 1- Quad data outlet at Teaching Wall and 2 quad
data outlets at Opposite Wall
- Support for Ceiling Mounted LCD projection
system with duplex electrical and duplex data
outlets in ceiling
- 1- Quad data outlet at Teacher's Station

HS 1.8 **9th Grade Computer/Flex Lab**

Technical Standard

FINISHES :

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU Ptd

Acoustics:

Refer to Technical Standards, C10-INTERIOR

CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

3' of tall wardrobe with file drawers

Option: supports monitor

12' computer work surface

16' of marker board

16' of tackboard

Window shades

Interactive white board (By Owner)

HVAC:

Independent Temperature Control

Air Conditioning

Plumbing:

Fire protection system

Electrical:

Emergency lighting

Means of egress by code

Clock (battery operated solar)

Fluorescent Lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1- Quad receptacle @ Teaching Wall and 3 quad receptacles @ Opposite Wall

2- Quad electrical outlets at Teacher's Station

Information Technology:

1- video port and monitor

1- voice port and phone

1- Quad data outlet at Teaching Wall and 2 quad data outlets at Opposite Wall

2- Quad data outlets at Teacher's Station

Support for Ceiling Mounted LCD projection system with duplex electrical and duplex data outlets in ceiling

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

12' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacles

Life safety devices per code

HS 1.9 9TH Grade Multipurpose Classroom

Technical Standard

FINISHES :

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Ptd

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

3' of tall wardrobe with file drawers

Option: supports monitor

12' of computer work surface

16' of marker board

16' of tack board

Window shades

Interactive white board (By Owner)

HVAC:

Independent Temperature Control

Plumbing:

Fire protection system

Electrical:

Multilevel switching

4 duplex receptacles

Fluorescent Lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1- Quad receptacle @ teaching wall and 3 quad
receptacles @ opposite wall

Emergency lighting

Means of egress by code

1- Quad electrical outlet at Teacher's Station

Information Technology:

1, video port and monitor

1, voice port and phone

1- Quad data outlet at Teaching Wall and 2 quad
data outlets at Opposite Wall

1- Quad data outlet at Teacher's Station

Support for Ceiling Mounted LCD projection
system with duplex electrical and duplex data
outlet in ceiling

HS 1.10 **9th Grade Teacher Storage**

Technical Standard

FINISHES :

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Ptd

FEATURES :

Fixed Equipment:

12' of open metal shelving (total) 84" high,
12" deep, 24" deep, or 30" deep

HVAC:

Independent Temperature Control

Plumbing:

Fire protection system

Electrical:

Duplex Outlets

Fluorescent Lighting:

Illumination Level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Life Safety devices per code.

Single level switching

HS 1.11 **10th – 12th Grade Driver's Education Lab**

Technical Standard

FINISHES :

Flooring:

Carpet

Optional: Vinyl composition tile

Base:

Resilient base

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

Provide (4) 4' x 6' driver simulators, with electrical connections for (8) simulators.

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

3' of tall wardrobe with file drawers

Optional: can support monitor

Computer work surface

16' of tack board (total)

12' of base & wall cabinets (total)

16' of marker board (total)

Window shades

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

4 duplex receptacles

Duplex receptacle adjacent to each data and video port

Central sound system

Life safety devices per code

Clock (battery, solar)

Technology:

1 video port and monitor

1 voice port and phone

1 data port near teacher workstation

4 data ports (minimum) for student use

Miscellaneous:

Operable partitions between classrooms are optional

HS 2.1.1 Radio and T.V. Broadcasting – Production Studio

Technical Standard

FINISHES :

Flooring:

Vinyl composition tile

Base:

CMU Glazed

Ceiling:

Suspended, acoustical absorbing.

Walls:

Painted Acoustical concrete masonry units

Acoustical wall treatment

(based on acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Video and audio equipment as required by the SDoP

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Theatrical Lighting as required by the SDoP.

Multilevel switching

6 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Emergency lighting per code

Means of egress lighting per code

Clock (battery operated solar)

Technology:

2 video ports, monitors, wall ceiling mounted.

1 voice port and phone

1 data port

Miscellaneous:

Doors are to have acoustic trim accessories, and
access to room from the circulation corridor into a foyer
or ante room connecting to the Production Studio.

HS 2.1.2 Radio and T.V. Broadcasting – Control Room

Technical Standard

FINISHES :

Flooring:
Carpet

Base:
CMU Glazed

Ceiling:
Suspended, acoustical absorbing.

Walls:
Painted Acoustical concrete masonry units

Acoustical wall treatment
(based on acoustic analysis)

Acoustics:
Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Video and audio equipment as required by the SDoP

Plumbing:
Fire protection system

HVAC:
Supply/return air system
Independent temperature control

Electrical:
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design

Multilevel switching
Duplex receptacles as required by the SDoP
Duplex receptacle adjacent to each data and video
port
Emergency lighting per code
Means of egress lighting per code
Clock (battery operated solar)

Technology:
2 video ports, monitors, wall ceiling mounted.
1 voice port and phone
1 data port

Miscellaneous:
Doors are to have acoustic trim accessories, and
access to room from the circulation corridor into a foyer
or ante room connecting to the Control Room.

HS 2.1.3 Radio and T.V. Broadcasting – Distribution Center

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile.

Base:

CMU Glazed

Ceiling:

Suspended, acoustical absorbing.

Walls:

Painted CMU

Acoustical wall treatment
(based on acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Video and audio equipment as required by the SDoP

Plumbing:

Fire protection system

HVAC:

Supply/return air system
Independent temperature control

Electrical:

Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design

Multilevel switching
Duplex receptacles as required by the SDoP
Duplex receptacle adjacent to each data and video
port
Emergency lighting per code
Means of egress lighting per code
Clock (battery operated solar)

Technology:

2 video ports, monitors, wall ceiling mounted.
1 voice port and phone
1 data port

HS 2.1.4 Radio and T.V. Broadcasting – Prop and Equipment

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile.

Base:

CMU Glazed

Ceiling:

Suspended, acoustical absorbing.

Walls:

Painted CMU

Acoustical wall treatment
(based on acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Metal Shelving as required by the SDoP

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

Duplex receptacles as required by the SDoP

Duplex receptacle adjacent to each data and video
port

Emergency lighting per code

Means of egress lighting per code

Clock (battery operated solar)

Technology:

2 video ports, monitors, wall ceiling mounted.

1 voice port and phone

1 data port

HS 2.1.5 Radio and T.V. Broadcasting – Workshop

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile.

Base:

CMU Glazed

Ceiling:

Suspended, acoustical absorbing.

Walls:

Painted CMU

Acoustical wall treatment
(based on acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Metal Shelving as required by the SDoP

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

Duplex receptacles as required by the SDoP

Duplex receptacle adjacent to each data and video
port

Emergency lighting per code

Means of egress lighting per code

Clock (battery operated solar)

Technology:

2 video ports, monitors, wall ceiling mounted.

1 voice port and phone

1 data port

HS 2.1.6 Radio and T.V. Broadcasting – Editing Rooms

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile.

Base:

CMU Glazed

Ceiling:

Suspended, acoustical absorbing.

Walls:

Painted CMU

Acoustical wall treatment
(based on acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Furniture as required by the SDoP.

Plumbing:

Fire protection system

HVAC:

Supply/return air system
Independent temperature control

Electrical:

Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design

Multilevel switching
Duplex receptacles as required by the SDoP
Duplex receptacle adjacent to each data and video
port
Emergency lighting per code
Means of egress lighting per code
Clock (battery operated solar)

Technology:

2 video ports, monitors, wall ceiling mounted.
1 voice port and phone
1 data port

HS 2.1.7 Radio and T.V. Broadcasting – Technical Processing

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile.

Base:

CMU Glazed

Ceiling:

Suspended, acoustical absorbing.

Walls:

Painted CMU

Acoustical wall treatment
(based on acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Furniture as required by the SDoP.

Plumbing:

Fire protection system

HVAC:

Supply/return air system
Independent temperature control

Electrical:

Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design

Multilevel switching
Duplex receptacles as required by the SDoP
Duplex receptacle adjacent to each data and video
port
Emergency lighting per code
Means of egress lighting per code
Clock (battery operated solar)

Technology:

2 video ports, monitors, wall ceiling mounted.
1 voice port and phone
1 data port

HS 2.1.8 Radio and T.V. Broadcasting - Office

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

4' of marker board

4' of tack board

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level – See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 Duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Technology:

1 video port

1 voice port and phone

1 data port near workstation

HS 2.1.9 Radio and T.V. Broadcasting - Related Classroom

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile

Base:

Vinyl Base

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Painted, Stud & impact board (non corridor walls)

Acoustical wall treatment
(based on acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

3' of tall wardrobe with file drawers

Option: supports monitor

12' computer work surface

16' of marker board

16' of tack board

Window shades

Plumbing:

Fire protection system

HVAC:

Independent temperature control

Electrical:

Multi level switching

4 duplex receptacles

Duplex receptacles adjacent to each data and Video port

Central sound system

Life safety devices according to code

Clock (battery operated solar)

Fluorescent Lighting:

Illumination Level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Emergency lighting

Means of egress lighting by code

Technology:

1 video port and monitor

1 voice port and phone

1 data port near teacher work station

4 data ports (minimum) for student use

HS 2.2.1 Graphics Occupations - Lab

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

16' of marker board
8' of tack board
30' of sink base cabinets w/2 sinks
30' of wall cabinets
Window shades
(2) Paper towel dispenser

Plumbing:

Fire protection system
Plumbing connections

HVAC:

Supply/return air system
Independent temperature control

Electrical:

Fluorescent lighting
Illumination level – See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Mutli level switching
20 Duplex receptacles
Duplex receptacle adjacent to each data and video
Port
Central sound system
Life safety devices per code
Clock (Battery operated solar)
220 volt service
Overhead electrical drops for printing equipment
Emergency shut-off for all equipment
Safety lights over plate making area
GFI outlets at sinks

Technology:

1 voice port and phone
8 data ports
Internet connectivity at all computers
Flexible electrical and data connections

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

20' of epoxy top base cabinets w/2 sinks

20' of wall cabinets

(2) Paper towel dispensers

Access via revolving darkroom door

Plumbing:

Fire protection system

Plumbing connections

Eyewash

HVAC:

Supply/return air system

Independent temperature control

Independent ventilation

Electrical:

Fluorescent lighting

Illumination level – See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

6 Duplex receptacles

Central sound system

Life safety devices per code

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

4' of marker board

4' of tack board

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level – See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 Duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Technology:

1 video port

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

FEATURES:

Fixed Equipment:

19' of open metal shelving (total),
84" high,
12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Fluorescent lighting
Illumination level – See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Single level switching
1 Duplex receptacles

HS 2.3.1 Certified Nursing Assistant – Practicum Lab (6) Beds Lecture

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

16' of marker board
8' of tack board
40' of sink base cabinets w/3 sinks
40' of wall cabinets
10' of reception counter
Window shades
(3) Paper towel dispensers

Plumbing:

Fire protection system
Plumbing connections

HVAC:

Supply/return air system
Independent temperature control

Electrical:

Fluorescent lighting
Illumination level – See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Multi level switching
20 Duplex receptacles (minimum)
Duplex receptacle adjacent to each data and video
Port
Central sound system
Life safety devices per code
Clock (battery operated solar)
GFI outlets at sinks

Technology:

1 video port, monitor, and brackets
1 voice port and phone
8 data ports
Internet connectivity at all computers
Flexible electrical and data connections

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

4' of marker board

4' of tack board

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level – See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 Duplex receptacles

Duplex receptacle adjacent to each data and video

Port

Central sound system

Life safety devices per code

Technology:

1 video port

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

10' – 16' of open metal shelving (total),
84" high,
12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Fluorescent lighting
Illumination level – See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Single level switching
Duplex receptacles
Life safety devices per code

HS 2.3.4 Certified Nursing Assistant - Changing Rooms/Lockers

Technical Standard

FINISHES :

Flooring:

Sealed concrete

Optional: Vinyl composition tile

Base:

Resilient base

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

Student lockers

Locker benches

24" x 60" mirror

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Exhaust air system

Supplemental heat as required

Individual temperature control

Electrical:

Fluorescent lighting

Illumination level – See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 Duplex receptacles

Life safety devices per code

Means of egress lighting per code

Clock (Battery Operated Solar)

HS 2.3.5 Certified Nursing Assistant – Rest Room (Assisted)

Technical Standard

FINISHES:

Flooring:

Ceramic or poured epoxy resin

Base:

Ceramic or epoxy painted

Ceiling:

Suspended, acoustical tile

Walls:

Epoxy painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

- 3” vanity w/sink
- (1) Paper towel dispenser
- (1) Soap dispenser
- 36” and 42” grab bars
- Bathtub grab bars
- 16”x 24” mirror
- (1) bath curtain rod

Plumbing:

- Fire protection system
- Tank-type toilet
- Residential bathtub
- Plumbing connections
- GFI outlets at sink

HVAC:

- Exhaust air system
- Supplemental heat as required

Electrical:

- Fluorescent lighting
 - Illumination level – See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Single level switching
- 2 Duplex receptacles
- Life safety devices per code
- Central sound system

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

6' of base cabinet

6' of adjustable shelving

Plumbing:

Fire protection system

Plumbing connections

Washer/dryer hookup

HVAC:

Exhaust air system

Supplemental heat as required

Clothes dryer exhaust

Electrical:

Fluorescent lighting

Illumination level – See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 Duplex receptacles

Life safety devices per code

Central sound system

Clock (battery operated solar)

HS 2.4.1 Health Professions – Practicum Lab

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

16' of marker board

8' of tack board

40' of sink base cabinets w/6 sinks and natural gas

(6) 4-person epoxy top student tables w/electric & Natural gas

10' of reception counter

Window shades

(6) Paper towel dispensers

Plumbing:

Fire protection system

Plumbing connections

Natural gas connections

Master gas shut-off valve

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level – See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

30 duplex receptacles (minimum)

Duplex receptacle adjacent to each data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port, monitor and brackets

1 voice port and phone

8 data ports

Internet connectivity at all computers

Flexible electrical and data connections

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

4' of tack board

4' of marker board

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level – See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Technology:

1 video port

1 voice port and phone

1 data port near workstation

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

10' – 16' of open metal shelving (total),
84" high,
12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Fluorescent lighting
Illumination level – See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Single level switching
Duplex receptacles
Life safety devices per code

HS 2.5.1 Hospitality Administration & Management – Practicum Lab & Front Desk

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

3' of tall wardrobe with file drawers

10' of bookcases (total)

16' of marker board (total)

16' of tack board (total)

10' of base cabinets (total)

Window shades

10' of wall cabinets (total)

Plumbing:

Fire protection system

HVAC:

Supply/Return air system

Independent temperature control

Electrical:

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

4 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port and monitor

1 voice port and phone

1 data port near teacher workstation

4 data ports (minimum) for student use

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs.

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

4' of tack board

4' of marker board

Plumbing:

Fire protection system

HVAC:

Supply/Return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and video
Port

Central sound system

Life safety devices per code

Technology:

1 video port

1 voice port and phone

1 data port near workstation

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

FEATURES:

Fixed Equipment:

19' of open metal shelving (total),
84" high
12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
1 duplex receptacles

HS 2.6.1 Culinary Arts- Food Lab

Technical Standard

FINISHES :

Flooring:

Quarry tile

Base:

Quarry tile

Ceiling:

Suspended, FRP acoustical tile or high density ceramic

Walls:

Epoxy painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

8' of tack board

Food service equipment

(3) Paper towel dispensers

Plumbing:

Fire protection system

Connections to food service equipment

Plumbing and gas connections

Hand washing lavatory

Master gas shut-off valve

HVAC:

Supply/return air system

Independent temperature control

Food service equipment fume hood

Air Conditioning

Electrical:

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

10 duplex receptacles

Duplex receptacle adjacent to each data and video port

Connections for food service equipment

Central sound system

Life safety devices per code

Clock (battery operated solar)

Means of egress lighting per code

220v service

Technology:

1 video port and monitor

1 voice port and phone

4 data ports

Flexible electrical and data connections

HS 2.6.2 Culinary Arts - Restaurant

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

6' of base cabinet

6' of cashier's station

Interior window

Plumbing:

Fire protection system

Water cooler – Dual Height

Connections to equipment (sewers station)

HVAC:

Supply/return air system

Independent temperature control

Air Conditioning

Electrical:

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

No incandescent lighting shall be used

Multilevel switching

4 duplex receptacles

Duplex receptacle adjacent to each data port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

2 data ports

1 voice port and phone

Technical Standard

FINISHES:

Flooring:

Quarry tile

Base:

Quarry tile

Ceiling:

FRP Acoustical Tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

10' - 16' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacles

Life safety devices per code

Technical StandardFINISHES:

Flooring:

Sealed concrete

Optional: Vinyl composition tile

Base:

Resilient base

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

Student lockers

Locker benches

24" x 60" mirror

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Exhaust air system

Supplemental heat as required

Individual temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

2 duplex receptacles

Life safety devices per code

Means of egress lighting per code

Clock (Battery Operated Solar)

HS 2.6.5 Culinary Arts- Related Classroom

Technical Standard

FINISHES:

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Painted

Stud & impact board (non corridor walls)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

3' of tall wardrobe with file drawers

Option: supports monitor

12' computer work surface

16' of marker board

16' of tack board

Window shades

HVAC:

Independent temperature control

Plumbing:

Fire protection system (when required by code)

Electrical:

Multilevel switching

Fluorescent Lighting:

Illumination Level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacles adjacent to each data and
video port

Central sound system

Life safety devices according to code

Clock (battery operated solar)

Emergency lighting

Means of egress lighting by code

Technology:

1, video port and monitor

1, voice port and phone

1, data port near teacher work station

4, data ports, (minimum) for student use

Miscellaneous:

Operable partitions between classrooms are optional.
For limited use.

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

10' – 16' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacles

Life safety devices per code

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

4' of marker board

4' of tack board

Interior window

2' of Tall wardrobe

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to data and
video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, FRP acoustical

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

6' of base cabinet

6' of adjustable shelving

Plumbing:

Fire protection system

Plumbing connections

Washer/Dryer hookup

HVAC:

Exhaust air system

Supplemental heat as required

Clothes dryer exhaust

Electrical:

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Central sound system

Life safety devices per code

Clock (battery operated solar)

HS 2.7.1 JROTC – Related Classroom

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Painted, Stud & impact board (non corridor walls)

Lighting :

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

3' of tall wardrobe with file drawers

Option: supports monitor

12' computer work surface

16' of marker board

16' of tack board

Window shades

Interactive white board (By Owner)

Plumbing:

Fire protection system

HVAC:

Independent temperature control

Air Conditioning

Electrical:

Multi level switching

1 Quad receptacle at Teaching Wall and 3 quad receptacles at Opposite Wall

4 duplex receptacles

1 quad electrical outlet at Teacher's Station

Central sound system

Life safety devices according to code

Clock (battery operated solar)

Fluorescent Lighting:

Illumination Level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Emergency lighting

Means of egress lighting by code

Technology:

1 video port and monitor

1 voice port and phone

1 quad data outlet at Teaching Wall

3 quad data outlets at Opposite Wall

1 quad outlet at Teacher's Station

Support for Ceiling mounted LCD projection

system with duplex electrical outlet and duplex data

outlet in ceiling

Miscellaneous:

Operable partitions between classrooms are optional. For limited use.

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry

FEATURES:

Fixed Equipment:

Shelf and rod

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Rated 2-hour construction

Walls:

Painted concrete masonry units

Rated 2-hour construction

FEATURES:

4' of open metal shelving (total)

84" high

12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Miscellaneous:

Wall, ceiling, and door construction to have a 2-hour fire rating.

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

34' of plastic laminate counter

24' of adjustable shelving

Interior window

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supply/return air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

2 duplex receptacles

Duplex receptacle adjacent to each data and

Video port

Life safety devices per code

Clock (battery operated solar)

Technology:

6 data ports

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES¹:

8' of base cabinets (total)

8' of tack board (total)

16' bookcases (total)

8' of wall cabinets (total)

Interior window

Plumbing:

Fire protection system

Plumbing connections

HVAC:

Independent temperature control

Supply/return air system

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

3 duplex receptacle

Duplex receptacle adjacent to each data port

Central sound system

Life safety devices per code

Clock (battery operated solar)

GFI outlets at sinks

Technology:

1 voice port and phone

1 data port

Technical Standard

FINISHES :

Flooring:

Sealed concrete

Optional: Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, FRP acoustical tile

Walls:

Painted concrete masonry units

FEATURES :

Fixed Equipment:

Student lockers

Locker benches

24" x 60" mirror

Plumbing:

Fire protection system

HVAC:

Supply/Return air system

Exhaust air system

Supplemental heat as required

Individual temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

2 duplex receptacle

Life safety devices per code

Means of egress lighting per code

Clock (battery operated solar)

HS 2.8.1 **Teacher Academy- Practicum Lab**

Technical Standard

FINISHES:

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended, Acoustical Tile

Walls:

CMU Painted

Stud & impact board (non corridor walls)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

3' of tall wardrobe with file drawers

Option: supports monitor

12' computer work surface

16' of marker board

16' of tackboard

Window shades

HVAC:

Independent temperature control

Plumbing:

Fire protection system (when required by code)

Electrical:

Multilevel switching

4 duplex receptacles

Duplex receptacle adjacent to each data and
video port

Central sound system

Life safety devices according to code

Clock (battery operated solar)

Fluorescent Lighting:

Illumination Level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Emergency lighting

Means of egress lighting by code

Information Technology:

1, video port and monitor

1, voice port and phone

1, data port near teacher work station

4, data ports, (minimum) for student use

Miscellaneous:

Operable partitions between classrooms are
optional. For limited use.

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

4' of tack board

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting: overhead

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and video port

Central sound system

Life safety devices per code

Technology:

1 video port

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical TILE

Walls:

Painted concrete masonry

FEATURES:

Fixed Equipment:

13' - 24' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

HS 2.9.1 Creative & Performing Arts - Music – Instrumental Music Room

Technical Standard

FINISHES :

Flooring: (Selection based on acoustic analysis)

Carpet

Optional: Vinyl composition tile

Raised step flooring

Base:

Resilient

Ceiling:

Suspended, acoustical absorbing and reflecting
(based on acoustic analysis)

Walls:

Painted concrete masonry units

Acoustical wall treatment

(based on acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

23' of base cabinets (total)

16' of marker board with staff lines (total)

16' of tack board (total)

9' of bookcases, 36" high (total)

3' sink base cabinet

Towel dispenser

Plumbing:

Sink 10" deep

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

GFI Outlet at Sink

Multilevel switching

6 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Emergency lighting per code

Means of egress lighting per code

High school music sound system

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

2 video ports, monitors, wall or ceiling mounted.

1 voice port and phone

1 data port

4 data ports for student use

Miscellaneous:

Doors are to have acoustic trim accessories, and
access to room from building circulation and instrument
storage room shall have 48-inch wide door leafs or a
double door w/o center jams.

HS 2.9.2 Creative & Performing Arts - Music – Instrumental Storage

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

Miscellaneous instrument storage cabinets

10'-21' of base cabinets (total)

10'-21' of wall cabinets (total)

Plumbing:

Fire protection system

Plumbing connections

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

1 duplex receptacle

Miscellaneous:

Doors to room shall have 48-inch wide door leaf or
double door w/o center jamb.

HS 2.9.3 Creative & Performing Arts - Music – Vocal Music Classroom

Technical Standard

FINISHES:

Flooring: (Selection based on acoustic analysis)

- Carpet
- Vinyl composition tile
- Raised Step Flooring

Base:

- Resilient

Ceiling:

- Suspended, acoustical tile

Walls:

- Painted concrete masonry units

Acoustical wall treatment

(based on acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

- 30' x 5' mirror mounted 12" above floor
- 16' of marker board with staff lines (total)
- 16' of tack board (total)
- 6' of base cabinets (total)
- 6' of tall storage cabinet
- 6' of wall cabinets (total)

Plumbing:

- Fire protection system
- Water cooler

HVAC:

- Supply/return air system
- Independent temperature control

Electrical:

- Fluorescent lighting
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Multilevel switching
- 6 duplex receptacles
- Duplex receptacle adjacent to each data and video port
- Emergency lighting per code
- Means of egress lighting per code
- High school music sound system
- Central sound system
- Life safety devices per code
- Clock (battery operated solar)

Technology:

- 2 video ports, monitors, wall or ceiling mounted
- 1 voice port and phone
- 1 data port
- 4 data ports for student use

Technical Standard

FINISHES:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

2' tall wardrobe

10' of work surface with file drawers

4' tall storage cabinet

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

1 video port

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

2' tall wardrobe

10' of work surface with file drawers

4' tall storage cabinet

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

1 video port

HS 2.9.6 Creative & Performing Arts - Music – Uniform/Robe Storage

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

-

FEATURES:

Fixed Equipment:

34'-44' of 108" (dependent on size of room)

high uniform storage cabinets

20"x 60" mirror

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

1 duplex receptacle

Technical Standard

FINISHES:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

9' of work surface with file drawers (total)

4' of marker board

4' of tack board

2' of tall wardrobe

6' of wall cabinets (total)

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and

Video port

Central sound system

Life safety devices per code

Technology:

1 video port

2 voice port and phone

1 data port near workstation

Technical Standard

FINISHES:

Flooring:
Carpet

Base:
Resilient

Ceiling:
Suspended, acoustical tile

Walls:
Painted concrete masonry units
Acoustical wall treatment
(varies with geometry of room)

Acoustics:
Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

3' wide x 5' high mirror mounted
12" above finish floor

Plumbing:
Fire protection system

HVAC:
Supply/return air system
Independent temperature control

Electrical:
Single level switching
Fluorescent lighting:
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
2 duplex receptacles
Central sound system
Life safety devices per code

HS 2.10.1 Creative & Performing Arts - Dance – Dance Studio

Technical Standard

FINISHES:

Flooring:

Hardwood Floor

Base:

Resilient base (ventilated)

Ceiling:

Painted exposed structure

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

16' of marker board (total)

8' of tack board (total)

Safety wainscot

16' full length mirrors

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Air Conditioning

Electrical:

High intensity discharge lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multi level switching

6 duplex receptacles

Duplex receptacle adjacent to each data and

Video port

Control Sound System

Means of egress lighting

Emergency lighting per code

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port

1 voice port

1 data port

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Optional: Vinyl composition tile

Base:

Resilient base

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

Loose Furnishings:

Wastebaskets

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

Student lockers

Locker benches

24" x 60" mirror

Plumbing:

Fire protection system

HVAC:

Supply/Return air system

Exhaust air system

Supplemental heat as required

Individual temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

2 duplex receptacles

Life safety devices per code

Means of egress lighting per code

Clock (battery operated solar)

HS 2.11.1 Creative & Performing Arts - Theater – Black Box Theater

Technical Standard

FINISHES:

Flooring:

Softwood floor

Base:

Resilient base, ventilated

Ceiling:

Suspended, acoustical

Painted exposed structure

Reflector panels

Walls:

Painted concrete masonry units

Acoustic wall treatment per acoustic analysis.

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Plumbing:

Fire protection system

HVAC:

Supply/Return air system

Independent temperature control

Electrical:

High intensity discharge lighting

Dimmable quartz lighting

Theatrical lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching with dimming

6 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Emergency lighting per code

Means of egress lighting per code

Clocks (battery operated solar)

Technology:

1 voice port

1 video port

1 data port

HS 2.12.1 Creative & Performing Arts – Art Classroom

Technical Standard

FINISHES :

Flooring:

Vinyl composition tile

Base:

Resilient base

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

3' sink base cabinet, 30" deep

3' of tall wardrobe with file drawers

10' of 30" deep base cabinets

16' of tack board (total)

16' of marker board (total)

Window shades

Tall storage cabinet with pull out shelves

10' of Wall cabinets

Towel dispenser

Interactive white board (By Owner)

Plumbing:

Sinks with solids interceptor

Plumbing connections

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Manually controlled general exhaust

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

4 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operated solar)

1- Quad receptacle at Teaching Wall and 3 quad
receptacles at Opposite Wall

1- Quad electrical outlet at Teacher's Station

Technology:

1 video port and monitor

1 voice port and phone

1- quad data outlet at Teacher's Wall and 2 quad data
outlets at Opposite Wall

1- Quad data outlet at Teacher's Station

Support for ceiling mounted LCD projection system
with duplex electrical outlets and data outlets in ceiling

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

Tall storage cabinets

Base cabinets 30” deep

Wall cabinets 12” deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacle above base cabinet

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

6' of base cabinets (total)

6' of wall cabinets (total)

Kiln

Plumbing:

Fire protection system

HVAC:

Temperature controlled exhaust

Ventilation for kiln

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Electrical connection for kiln

Central sound system

Life safety devices per code

HS 2.13.1 **Accounting - Lab**

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

16' of marker board

8' of tack board

20' of base cabinets

20' of wall cabinets

Window shades

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Flourescent lighting , parabolic lenses

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multi level switching

6 duplex receptacles (minimum)

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port, monitor, and brackets

1 voice port and phone

1 data port near teacher workstation

26 data ports

Flexible electrical and data connections

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

4' of marker board

4' of tack board

2' of tall wardrobe

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Duplex receptacle adjacent to data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

12' lockable storage cabinets

84" high

24" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

Duplex receptacles

Life safety devices per code

Technology:

1 voice port and phone

1 data port near workstation

HS 2.14.1 Business Technology – Lab

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

16' of marker board
8' of tack board
20' of base cabinets
20' of wall cabinets
Window shades
Clock (Battery Operated Solar)

Plumbing:

Fire protection system

HVAC:

Supply/return air system
Independent temperature controls

Electrical:

Fluorescent lighting with Parabolic lenses
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Multilevel switching
4 duplex receptacles
Duplex receptacle adjacent to
data and video port
Emergency lighting per code
Means of egress lighting per code
Central sound system
Life safety devices per code
Clock (Battery Operated Solar)
Receptacle for printer

Technology:

1 Voice port and phone
30 data port
1 video part

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature controls

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to
data and video port

Central sound system

Life safety devices per code

Technology:

1 Voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Suspended Acoustical Tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

16' of open metal shelving (total)

84" high,

12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacle

Life safety devices per code

HS 2.15.1 IT Database - Lab

Technical Standard

FINISHES:

Flooring:

- Vinyl composition tile
- 4' width in front of cabinets

Base:

- Resilient

Ceiling:

- Suspended, acoustical tile

Walls:

- Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

- 16' of marker board (total)
- 8' of tack board (total)

Plumbing:

- Fire protection system
- Plumbing connections

HVAC:

- Supply/return air system
- Independent temperature controls

Electrical:

- Fluorescent lighting with Parabolic lenses
- Illumination level: See Table 8600-10 Section D50-ELECTRICAL – Lighting Design
- Multilevel switching
- 4 duplex receptacles
- Duplex receptacle adjacent to data and video port
- Emergency lighting per code
- Means of egress lighting per code
- Central sound system
- Life safety devices per code
- Clock (Battery Operated Solar)
- Receptacle for printer

Technology:

- 1 video port, monitor, wall or ceiling mounted
- 1 voice port and phone
- Classroom area network

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature controls

Electrical:

Single level switching

Fluorescent lighting with

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to

data and video port

Central sound system

Life safety devices per code

Clock (Battery Operated Solar)

Technology:

1 voice port and phone.

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Suspended Acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

12' of open metal shelving (total)

84" high,

12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting with

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacle

Life safety devices per code

Technical Standard

FINISHES:

Flooring:

- Vinyl composition tile
- 4' width in front of cabinets

Base:

- Resilient

Ceiling:

- Suspended, acoustical tile

Walls:

- Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

- 16' of marker board (total)
- 9' of wall cabinets (total)
- 6' of base cabinet with heavy duty counter top (total)
- 8' of tack board (total)

Plumbing:

- Fire protection system
- Sink, 12" deep
- Plumbing connections

HVAC:

- Supply/return air system
- Independent temperature controls

Electrical:

- Fluorescent lighting with parabolic lenses
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Multilevel switching
- 4 duplex receptacles
- Duplex receptacles adjacent to each data and video port
- Emergency lighting per code
- Means of egress lighting per code
- Central sound system
- Life safety devices per code
- Clock (Batter oper. Solar)
- Receptacle for printer

Technology:

- 1 video port, monitor, wall or ceiling mounted.
- 1 voice port and phone
- Classroom area network (30 data ports minimum)

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacles adjacent to
each data and video port

Central sound system

Life safety devices per code

Clock (Batter operated Solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Suspended Acoustical Tile

Walls:

Painted concrete masonry units

FEATURES¹:

Fixed Equipment:

12' of open metal shelving (total),
84" high,
12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting

Design

Duplex receptacles
Life safety devices per code

HS 2.17.1 IT Computer Technology - Lab

Technical Standard

FINISHES:

Flooring:

- Vinyl composition tile
- 4' width in front of cabinets

Base:

- Resilient

Ceiling:

- Suspended, acoustical tile

Walls:

- Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

- 16' of marker board (total)
- 9' of wall cabinets (total)
- 6' of base cabinet with heavy duty counter top (total)
- 8' of tack board (total)

Plumbing:

- Fire protection system
- Sink, 12" deep
- Plumbing connections

HVAC:

- Supply/return air system
- Independent temperature controls

Electrical:

- Fluorescent lighting with parabolic lenses
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Multilevel switching
- 4 duplex receptacles
- Duplex receptacles adjacent to each data and video port
- Emergency lighting per code
- Means of egress lighting per code
- Central sound system
- Life safety devices per code
- Clock (Batter oper. Solar)
- Receptacle for printer

Technology:

- 1 video port, monitor, wall or ceiling mounted.
- 1 voice port and phone
- Classroom area network (30 data ports minimum)

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacles adjacent to
each data and video port

Central sound system

Life safety devices per code

Clock (Battery operated Solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Suspended Acoustical Tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

12' of open metal shelving (total),
84" high,
12" deep. 24" deep. or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Duplex receptacle
Life safety devices per code

HS 2.18.1 IT Web Page Design - Lab

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

16' of marker board (total)
9' of wall cabinets (total)
6' of base cabinet with heavy duty
counter top (total)
8' of tack board (total)
Towel dispenser

Plumbing:

Fire protection system
Plumbing connections

HVAC:

Supply/return air system
Independent temperature controls

Electrical:

Fluorescent lighting with
parabolic lenses
Illumination level: See Table 8600-10
Section d50-ELECTRICAL – Lighting Design
Multilevel switching
4 duplex receptacles
Duplex receptacle adjacent to
data and video port
Emergency lighting per code
Means of egress lighting per code
Central sound system
Life safety devices per code
Clock (Battery Oper. Solar)
Receptacle for printer

Technology:

1 video port, monitor, wall or ceiling mounted.
1 voice port and phone
Classroom area network
(30 data ports minimum)

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to

data and video port

Central sound system

Life safety devices per code

Clock (Battery Operated Solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES :

Flooring:

Sealed Concrete

Base:

Resilient

Ceiling:

Suspended Acoustical Tile

Walls:

Painted concrete masonry units

FEATURES :

Fixed Equipment:

12' of open metal shelving (total)

84" high,

12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacles

Life safety devices per code

HS 2.19.1 **CADD Drafting – Lab**

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

3' of tall wardrobe with file drawers

16' of marker board (total)

16' of tack board (total)

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting with
parabolic lenses

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

6 duplex receptacles

Duplex receptacles adjacent to
each data and video port

Means of Egress Lighting by code

Emergency lighting per code

Central sound system

Life safety devices per code

Clock (Batter oper. Solar)

Receptacle for printer/plotter

Technology:

1 video port and monitor ceiling or wall mounted

1 voice port and phone

1 data port near teacher workstation

Classroom area network

(30 data ports minimum)

Technical StandardFINISHES :

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES :

Fixed Equipment:

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacles adjacent to

each data and video port

Multilevel switching

Central sound system

Life safety devices per code

Clock (Battery Operated Solar)

Technology:

1 voice port and phone

1 data port near teacher workstation

Technical Standard

FINISHES :

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Suspended Acoustical Tile

Walls:

Painted concrete masonry units

FEATURES :

Fixed Equipment:

12' of open metal shelving (total)
84" high,
12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Duplex receptacles
Life safety devices per code

HS 2.20.1 Building Property Management & Maintenance – Practicum Lab

Technical Standard

FINISHES :

Flooring:

Sealed concrete

Ceiling:

Exposed Structure

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

- 16' of marker board
- 8' of tack board
- 24' of tall storage cabinets
- (3) Paper towel dispensers
- 12'x14' motorized overhead sectional door to ext.
- 3'x7' hollow metal man-door to exterior
- Steel bollards at overhead door, both sides

Plumbing:

- Fire protection system
- 1 Wash fountain (minimum)
- 2 Utility sinks (minimum)
- 2 hose bibbs (minimum)
- Safety shower/Eye wash
- 6 Compressed air connections
- 2 Natural gas connections
- Floor drains and/or
- Trench drain
- Master gas shut-off valve

HVAC:

- Supply/return air system
- Independent temperature control
- Welding hood and exhaust

Electrical:

- High-intensity lighting
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Multilevel switching
- 30 duplex receptacles (minimum)
- Duplex receptacle adjacent to data and video port
- Central sound system
- Life safety devices per code
- Clock (battery operated solar)
- (2) 220 volt receptacles
- (2) 227 volt receptacles
- (2) 408 volt receptacles

Technology:

- 1 Video port, monitor and brackets
- 1 Voice port and phone
- 4 Data ports

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed Structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

12' of open metal shelving (total)

84" high,

12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacle

Life safety devices per code

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent
to data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

HS 2.20.4 Building Property Management & Maintenance – Changing Room

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended FRP, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

Student lockers

Locker benches

24" x 60" mirror

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 Duplex receptacles

Life safety devices per code

Means of egress lighting per code

Clock (battery operable solar)

HS 2.20.5 Building Property Management & Maintenance – Tool Crib

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Optional: Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

80' of open metal shelving (total),

84" high, 12" deep, 24" deep, or 30" deep

Dutch door

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting

Design

Single level switching

4 duplex receptacles

Life safety devices per code

HS 2.21.1 **Carpentry – Practicum Lab**

Technical Standard

FINISHES :

Flooring:

Sealed Concrete

Walls:

Painted concrete masonry units

Ceiling:

Exposed Structure

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

16' of marker board

8' of tack board

24' of tall storage cabinets

(2) Lumber storage racks

(3) Paper towel dispensers

12'x14' motorized overhead sectional door to ext.

3'x7' hollow metal mandoor to exterior

Steel bollards at overhead door, both sides

Plumbing:

Fire Protection system

1 Wash fountain (minimum)

2 Utility sinks (minimum)

2 hose bibbs (minimum)

Safety shower/Eye wash

6 Compressed air connections

Floor drains and/or

Trench drain

HVAC:

Supply/return air system

Independent temperature control

Dust collection system

Electrical:

High-intensity lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

30 duplex receptacles (minimum)

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operated solar)

GFI outlets at sinks

Technology

1 video port, monitor, and brackets

1 voice port and phone

4 data ports

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

12' of open metal shelving (total)

84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

Duplex receptacles

Life safety devices per code

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Duplex receptacle adjacent to data and video port

Central sound system

Life safety devices per code

Clock (battery operable solar)

Technology:

1 video port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended FRP, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

Student lockers

Locker benches

24" x 60" mirror

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 Duplex receptacles

Life safety devices per code

Means of egress lighting per code

Clock (battery operable solar)

Technical StandardFINISHES:

Flooring:

Sealed concrete

Optional: Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

80' of open metal shelving (total),

84" high, 12" deep, 24" deep, or 30" deep

Dutch door

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Life safety devices per code

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

34' of plastic lam. Counter

27' of adjustable shelving

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 Duplex receptacles

Duplex receptacle adjacent to

Each data and video port

Life safety devices per code

Clock (battery operated solar)

Technology:

6 data ports

Technical StandardFINISHES:

Flooring:

Sealed Concrete

Ceiling:

Painted exposed structure

Walls:

Painted concrete exposed structure

Base:

Not Required

FEATURES:

Plumbing:

Fire Protection system

HVAC

Supplemental heat as required

Independent ventilation

Electrical:

Fluorescent lighting:

Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting

Design

Single level switching

4 Duplex receptacles

Central sound system

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent

To data and video port

Central sound system

Life safety devices per code

Clock Battery Operated Solar

Technology:

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

Student lockers
Locker benches
24" x 60" mirror

Plumbing:

Fire protection system

HVAC:

Supply/return air system
Exhaust air system
Supplemental heat as required
Individual temperature control

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
2 duplex receptacles
Life safety devices per code
Means of egress lighting per code
Clock (Battery Operated Solar)

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

80' of open metal shelving (total), 84" high,
12" deep, 24" deep, or 30" deep
Dutch door

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
4 duplex receptacles
Life safety devices per code

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

34' of plastic Laminate Counter

27' of adjustable shelving

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacle adjacent to each data port and
video port

2 duplex receptacles

Life safety devices per code

Clock (Battery Operated Solar)

Technology:

6 data ports

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

N/A

Ceiling:

Portland cement plaster

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

16' of pegboard

Pair of doors

Interior window

Plumbing:

Fire protection system

HVAC:

Supplemental heat as required

Independent ventilation

Electrical: - all explosion proof devices

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Central sound system

Life safety devices per code

Clock (Battery Operated Solar)

HS 2.23.1 Engineering Related Technology – Practicum Lab

Technical Standard

FINISHES :

Flooring:

Sealed concrete

Ceiling:

Painted exposed structure

Walls:

Painted concrete masonry walls

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

- 16' of marker board
- 8' of tack board
- 24' of tall storage cabinets
- (3) Paper towel dispensers
- 12'x14' motorized overhead sectional door
to exterior
- 3'x7' hollow metal man door to exterior
- Steel bollards at overhead door, both sides

Plumbing:

- Fire protection system
- 1 wash fountain (minimum)
- 2 utility sinks (minimum)
- 2 hose bibs (minimum)
- Safety shower/eye wash
- 6 compressed air connections
- Floor drains and/or trench drains

HVAC:

- Supply/return air system
- Independent temperature control
- Welding hood and exhaust

Electrical:

- High-density lighting:
 - Illumination level – See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Multilevel switching
- 30 duplex receptacles (minimum)
- Duplex receptacle adjacent to each data
and video port
- Central sound system
- Life safety devices per code
- Clock (battery operated solar)
- (6) 220v receptacles

Technology:

- 1 video port, monitor, and brackets
- 1 voice port and phone
- 4 data ports

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

 Illumination level: See Table 8600-10

 Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

12' of open metal shelving (total), 84" high,
12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacle

Life safety devices per code

HS 2.24.1 Electrical Lab/Environmental HVAC – Practicum Lab

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Ceiling:

Painted exposed structure

Walls:

Painted concrete masonry walls

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

16' of marker board

8' of tack board

24' of tall storage cabinets

(3) Paper towel dispensers

12'x14' motorized overhead sectional door
to exterior

3'x7' hollow metal man door to exterior

Steel bollards at overhead door, both sides

Plumbing:

Fire protection system

1 wash fountain (minimum)

2 Utility sinks (minimum)

2 hose bibbs (minimum)

Safety shower/eye wash

Floor drains and/or trench drain

HVAC:

Supply/return air system

Independent temperature control

Electrical:

High-intensity lighting

Illumination level – See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

30 duplex receptacles (minimum)

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operated solar)

208v 3-phase service

480v 3 phase service

100 amp 208v 3-phase bus duct

100 amp 480v 3-phase bus duct

Technology:

1 video port, monitor, and brackets

1 voice port and phone

4 data ports

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry walls

FEATURES:

Fixed Equipment:

12' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacles

Life safety devices per code

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient base

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry walls

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry walls

FEATURES:

Fixed Equipment:

80' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep
Dutch door

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
4 duplex receptacles
Life safety devices per code

HS 2.25.1 Horticulture and Resource Management – Practicum Lab

Technical Standard

FINISHES:

Flooring:

Sealed Concrete

Ceiling:

Painted exposed structure

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

16' of marker board

8' of tack board

24' of tall storage cabinets

3 paper towel dispensers

12' x 14' motorized overhead sectional door to exterior

3' x 7' hollow metal man door to exterior

Steel bollards at overhead door, both sides

Plumbing:

Fire protection system

1 wash fountain (minimum)

2 utility sinks (minimum)

2 hose bibbs (minimum)

Safety shower/Eye wash

Floor drains and/or trench drain

HVAC:

Supply/return air system

Independent temperature control

Electrical:

High-intensity lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

30 duplex receptacles (minimum) on ground floor

Duplex receptacle adjacent to each data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port, monitor, and brackets

1 voice port and phone

4 data ports

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

10' of base cabinets

4' of cashier's station

(1) paper towel dispenser

Plumbing:

Fire protection system

1 utility sink

Plumbing connections

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Flourescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Duplex receptacle adjacent to each data port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port, monitor, and brackets

1 voice port and phone

1 data port

Technical Standard

SITE FEATURES:

Greenhouse:

- ½ earth flooring, ½ concrete flooring
(w/floor drains)
- Minimum of one 8'x10' overhead door.
- Provide electrical, plumbing, and heating/
Ventilation systems as per greenhouse
manufacturer's recommendations.
- Minimum of 4 hose bibbs
- Fire protection system if required

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near teacher workstation

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

12' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Duplex receptacle
Life safety devices per code

HS 2.26.1 Natural Resource Management – Practicum Lab

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Ceiling:

Painted exposed structure

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

- 16' of marker board
- 8' of tack board
- 24' of tall storage cabinets
- (3) Paper towel dispensers
- 12'x14' motorized overhead sectional door to ext.
- 3'x7' hollow metal mandoor to exterior
- Steel bollards at overhead door, both sides

Plumbing:

- Fire protection system
- 1 Washfountain (minimum)
- 2 Utility sinks (minimum)
- 2 hose bibs (minimum)
- Safety shower/Eye wash
- 6 Compressed air connections
- 4 Natural gas connections
- Floor drains and/or trench drain
- Master gas shut-off valve

HVAC:

- Supply/return air system
- Independent temperature control
- Welding hood and exhaust

Electrical:

- High-intensity lighting
 - Illumination level : See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Multilevel switching
- 30 duplex receptacles (minimum)
- Central sound system
- Life safety devices per code
- Clock (Battery Operated Solar)
- (4) 220v receptacles

Technology:

- 1 Video port, monitor, and brackets
- 1 Voice port and phone
- 4 Data ports

Technical Standard

Site Features:

Greenhouse:

- Concrete Flooring (w/floor drains)
- Provide electrical, plumbing, and heating/ventilation systems as per greenhouse manufacturer's recommendations.
- Fire protection system if required.
- Hose bibs

Technical Standard

FINISHES :

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

Interior windows

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Sealed Concrete

Base:

Resilient base

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

12' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Fluorescent lighting
Illumination level: See Table 8600-10
See Section D50-ELECTRICAL – Lighting Design
Duplex receptacles
Life safety devices per code
Single level switching

HS 2.27.1 Auto Body- Practicum Lab

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Ceiling:

Painted exposed structure

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

- 16' of marker board
- 8' of tack board
- 24' of tall storage cabinets
- 4 car lifts
- 1 frame rack
- (4) paper towel dispensers
- 12' x 14' motorized overhead sectional door to exterior
- 3' x 7' hollow metal man-door to exterior
- Steel bollards at overhead door, both sides
- Paint spray booth
- Frame straightener

Plumbing:

- Fire protection system
- 2 wash-fountains (minimum)
- 2 utility sinks (minimum)
- 2 hose bibs (minimum)
- Safety shower/eye-wash
- 8 compressed air connections
- 4 floor drains
- 1 trench drain

HVAC:

- Make up air- closed loop radiant heating
- Independent temperature control
- Vehicle exhaust system

Electrical:

- All electrical explosion proof
- High-intensity lighting:
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Multilevel switching
- 30 duplex receptacles (minimum)
- Duplex receptacle adjacent to data and video port
- Central sound system
- Life safety devices per code
- Clock (battery operated solar)
- (6) 220v receptacles
- GFI outlets at sinks

Technology:

- 1 video port, monitor, and brackets
- 1 voice port and phone
- 6 data ports
- Flexible electrical and data connections

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

N/A

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

Note: If fire ratings are required, ceilings meeting requirements shall be provided.

FEATURES:

Fixed Equipment:

3' of heavy duty adjustable steel shelving

Plumbing:

Fire protection system

HVAC:

Supplemental heat as required

Independent ventilation

Electrical:

Explosion proof devices required

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 duplex receptacles

Central sound system

Life safety devices per code

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

4' of marker board

4' of tack board

2' of tall wardrobe

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to data and
video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Optional: Vinyl composition tile

Base:

Resilient base

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

LOOSE FURNISHINGS

Wastebaskets

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

Student locker

Locker benches

24" x 60" mirror

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Exhaust air system

Supplemental heat as required

Individual temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

2 duplex receptacles

Life safety devices per code

Means of egress lighting per code

Clock (battery operated solar)

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

N/A

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

80' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep
Dutch door

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Explosion proof devices

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Life safety devices per code

HS 2.27.6 Auto Body- Related Classroom

Technical Standard

FINISHES:

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Painted

Concrete Masonry Units

Stud & impact board (non corridor walls)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

3' of tall wardrobe with file drawers

Option: supports monitor

12' computer work surface

16' of marker board

16' of tack board

Window shades

Interactive white board (By Owner)

HVAC:

Independent temperature control

Plumbing:

Fire protection system (when required by code)

Electrical:

Multilevel switching

Fluorescent Lighting:

Illumination Level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacles adjacent to each data and
video port

Central sound system

Life safety devices according to code

Clock (battery operated solar)

Emergency lighting

Means of egress lighting by code

1- Quad electrical outlet at Teacher's Station

1- Quad receptacle at Teaching Wall and 3 quad
receptacles at Opposite Wall

Technology:

1- video port and monitor

1- voice port and phone

1- data port near teacher work station

4- data ports, (minimum) for student use

1- Quad data outlet at Teacher's Station

Support for ceiling mounted LCD projection system
with duplex electrical outlet and duplex data outlet in
ceiling

Miscellaneous:

Operable partitions between classrooms are
optional..

For limited use

HS 2.27.7 **Auto Body- Unisex Restroom**

Technical Standard

FINISHES:

Flooring:

Ceramic mosaic tile or poured epoxy resin

Base:

Ceramic mosaic tile or painted epoxy

Ceiling:

Suspended, FRP, acoustical

Walls:

Epoxy painted concrete masonry units

FEATURES:

Fixed Equipment:

Towel dispenser
24" x 60" mirror
Toilet tissue holder
36" and 42" grab bar
Soap dispenser

Plumbing:

Wall-mounted water closet
Wall-mounted lavatory
Plumbing connections
Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting:
 Illumination level: See Table 8600-10
 Section D50-ELECTRICAL – Lighting Design
1 duplex receptacle
Central sound system
Life safety devices per code

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, FRP, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

6' of base cabinet

6' of adjustable shelving

Plumbing:

Fire protection system

Plumbing connections

Washer/dryer hookup

HVAC:

Exhaust air system

Supplemental heat as required

Clothes dryer exhaust

Electrical:

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technical StandardFINISHES:

Flooring:

Sealed concrete

Ceiling:

Painted exposed structure

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

16' of marker board
8' of tack board
24' of tall storage cabinets
Pencil sharpener support
6 car lifts
1 frame rack
(4) paper towel dispensers
12' x 14' motorized overhead sectional door to exterior
3' x 7' hollow metal man-door to exterior
Steel bollards at overhead door, both sides

Plumbing:

Fire protection system
2 wash-fountains (minimum)
2 utility sinks (minimum)
2 hose bibs (minimum)
Safety shower/eye-wash
8 compressed air connections
4 floor drains
1 trench drain

HVAC:

Make up air- closed loop radiant heating
Independent temperature control
Vehicle exhaust system

Electrical:

All electrical explosion proof
High-intensity lighting:
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Multilevel switching
30 duplex receptacles (minimum)
Duplex receptacle adjacent to data and video port
Central sound system
Life safety devices per code
Clock (battery operated solar)
(6) 220v receptacles

Technology:

1 video port, monitor, and brackets
1 voice port and phone
6 data ports
Flexible electrical and data connections

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

N/A

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

Note: If fire ratings are required, ceilings meeting requirements shall be provided.

FEATURES:

Fixed Equipment:

3' of heavy duty adjustable steel shelving

Plumbing:

Fire protection system

HVAC:

Supplemental heat as required

Independent ventilation

Electrical:

Explosion proof devices required

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 duplex receptacles

Central sound system

Life safety devices per code

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

4' of marker board

4' of tack board

2' of tall wardrobe

Interior window

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

4 duplex receptacles

Duplex receptacle adjacent to data and
video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Optional: Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

Student lockers

Locker benches

24" x 60" mirror

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Exhaust air system

Supplemental heat as required

Individual temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

2 duplex receptacles

Life safety devices per code

Means of egress lighting per code

Clock

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

N/A

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

80' of open metal shelving (total),

84" high, 12" deep, 24" deep, or 30" deep

Dutch door

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Explosion proof devices

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Life safety devices per code

Technical Standard

FINISHES:

Floor:

Vinyl Composition Tile

Base:

CMU Glazed

Concrete Masonry Units

Ceiling:

Suspended Acoustical Tile

Walls:

CMU, Painted

Concrete Masonry Units

Stud & impact board (non corridor walls)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

3' of tall wardrobe with file drawers

Option: supports monitor

12' of computer work surface

16' of marker board

16' of tack board

Window shades

HVAC:

Independent temperature control

Plumbing:

Fire protection system (when required by code)

Electrical:

Multilevel switching

Fluorescent Lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacles adjacent to each data and
video port

Central sound system

Life safety devices according to code

Clock (battery operated solar)

Emergency lighting

Means of egress lighting by code

Technology:

1, video port and monitor

1, voice port and phone

1, data port near teacher work station

4, data ports, (minimum) for student use

D-50 Electrical

Miscellaneous:

Operable partitions between classrooms
are optional.

For limited use.

Technical Standard

FINISHES:

Flooring:

Ceramic mosaic tile or poured epoxy resin

Base:

Ceramic mosaic tile or epoxy painted

Ceiling:

Suspended, FRP, acoustical

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

Towel dispenser
24" x 60" mirror
Toilet tissue holder
36" and 42" grab bar
Soap dispenser

Plumbing:

Wall-mounted water closet
Wall-mounted lavatory
Plumbing connections
Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting:
 Illumination level: See Table 8600-10
 Section D50-ELECTRICAL – Lighting Design
1 duplex receptacle
Central sound system
Life safety devices per code

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, FRP, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

6' of base cabinet

6' of adjustable shelving

Plumbing:

Fire protection system

Plumbing connections

Washer/dryer hookup

HVAC:

Exhaust air system

Supplemental heat as required

Clothes dryer exhaust

Electrical:

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Central sound system

Life safety devices per code

Clock (battery operated solar)

HS 3.1 **Art Department – 2D/3D Art Studio**

Technical Standard

FINISHES :

Flooring:

Vinyl composition tile

Base:

Resilient base

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

3' sink base cabinet, 30" deep

3' of tall wardrobe with file drawers

10' of 30" deep base cabinets

16' of tack board (total)

16' of marker board (total)

Window shades

Tall storage cabinet with pull out shelves

10' of Wall cabinets

Towel dispenser

Plumbing:

Sink with solids interceptor

Plumbing connections

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Manually controlled general exhaust

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

4 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port and monitor

1 voice port and phone

1 data port near teacher workstation

4 data ports (minimum) for student use

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

Tall storage cabinets

Base cabinets 30” deep

Wall cabinets 12” deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacle above base cabinet

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

6' of base cabinets (total)

6' of wall cabinets (total)

Kiln

Plumbing:

Fire protection system

HVAC:

Temperature controlled exhaust

Ventilation for kiln

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Electrical connection for kiln

Central sound system

Life safety devices per code

HS 4.1 Music Department – Instrumental Music Room

Technical Standard

FINISHES :

Flooring: (Selection based on acoustic analysis)

Carpet

Optional: Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical absorbing and reflecting
(based on acoustic analysis)

Walls:

Painted concrete masonry units

Acoustical wall treatment

(based on acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

23' of base cabinets (total)

16' of marker board with staff lines (total)

16' of tack board (total)

9' of bookcases, 36" high (total)

3' sink base cabinet

Towel dispenser

Plumbing:

Sink 10" deep

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

GFI Outlet at Sink

Multilevel switching

6 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Emergency lighting per code

Means of egress lighting per code

High school music sound system

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

2 video ports, monitors, wall ceiling mounted.

1 voice port and phone

1 data port

4 data ports for student use

Miscellaneous:

Doors are to have acoustic trim accessories, and
access to room from building circulation and instrument
storage room shall have 48-inch wide door leafs or a
double door w/o center jams.

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

Miscellaneous instrument storage cabinets

10’-21’ of base cabinets (total)

10’-21’ of wall cabinets (total)

Plumbing:

Fire protection system

Plumbing connections

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

1 duplex receptacle

Miscellaneous:

Doors to room shall have 48-inch wide door leaf or
double door w/o center jamb.

HS 4.3 Music Department – Vocal Music Classroom

Technical Standard

FINISHES:

Flooring: (Selection based on acoustic analysis)

- Carpet
- Vinyl composition tile

Base:

- Resilient

Ceiling:

- Suspended, acoustical tile

Walls:

- Painted concrete masonry units

- Acoustical wall treatment
(based on acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

- 30' x 5' mirror mounted 12" above floor
- 16' of marker board with staff lines (total)
- 16' of tack board (total)
- 6' of base cabinets (total)
- 6' of tall storage cabinet
- 6' of wall cabinets (total)
- 3' of Tall wardrobe

Plumbing:

- Fire protection system
- Water cooler – Dual Height

HVAC:

- Supply/return air system
- Independent temperature control

Electrical:

- Fluorescent lighting
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Multilevel switching
- 6 duplex receptacles
- Duplex receptacle adjacent to each data and video port
- Emergency lighting per code
- Means of egress lighting per code
- High school music sound system
- Central sound system
- Life safety devices per code
- Clock (battery operated solar)

Technology:

- 2 video ports, monitors, wall or ceiling mounted
- 1 voice port and phone
- 1 data port
- 4 data ports for student use

Technical Standard

FINISHES:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

3’ of tall wardrobe

10’ of work surface with file drawers

4’ tall storage cabinet

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

1 video port

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

-

FEATURES:

Fixed Equipment:

34'-44' of 108" (dependent on size of room)

high uniform storage cabinets

20"x 60" mirror

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

1 duplex receptacle

Technical StandardFINISHES:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustical wall treatment

(varies with geometry of room)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

3' wide x 5' high mirror mounted 12" above
above finish floor

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 duplex receptacles

Central sound system

Life safety devices per code

Clock (battery operated solar)

Miscellaneous:

Doors shall have 48-inch wide leafs and acoustic seals.

HS 5.1 Physical Education – Gymnasium

Technical Standard

FINISHES :

Flooring:

Wood

Base:

Ventilated resilient base

Ceiling:

Painted exposed structure (acoustical deck)

Walls:

Painted concrete masonry units

Sound absorption concrete masonry and/or acoustic panels based on acoustic analysis.

Miscellaneous:

Handicapped seating

Court markings (minimum)

84 x 50 basketball court

(2) cross-court basketball courts

Regulation volleyball courts

Provide wire guards on light fixtures and wall-mounted electrical devices.

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

Telescoping stands

6 basketball backstops, glass

Volleyball sleeves and standards on a cart

Safety wall wainscot

Scorer's table

Divider gym curtain

Plumbing:

Fire protection system

Plumbing connections

Single unit dual height double bowl drinking fountains. Note: provide two units, one on each side of the gymnasium.

HVAC:

Supply/return air system

Independent temperature control

Air Conditioning (to be determined on a case by case basis)

Electrical:

High intensity discharge lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

8 duplex receptacles

Duplex receptacle adjacent to each data and video port

Central sound system

Gymnasium sound system

Emergency lighting per code

Means of egress lighting per code

Electrical connections to P.E. equipment where necessary

Life safety devices per code

Clocks (battery operated solar) with wire guard

Scoreboard (control outlets in the face of bleachers)

Technology:

4 video ports, 1 monitor with cart

3 data ports

1 voice port

HS 5.2 Physical Education – Second Gymnasium

Technical Standard

FINISHES:

Flooring:

Wood flooring

Base:

Ventilated resilient base

Ceiling:

Painted exposed structure (acoustical deck)

Walls:

Painted concrete masonry units

Sound absorption concrete masonry and/or acoustic panels based on acoustic analysis.

Miscellaneous:

Court markings (minimum)

84' x 50' main basketball court

(2) cross-courts to fit

Regulation volleyball courts

Provide wire guards on light fixtures and wall-mounted electrical devices.

Note: This gymnasium shall not have spectator seating.

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

6 basketball backstops, glass

Volleyball sleeves and standards on a cart

Safety wall wainscot

Divider gym curtain

Chin-up bar

Portable Mat Hoist

Plumbing:

Plumbing connections

Fire protection system

Single unit dual height double bowl drinking fountain. (one unit)

HVAC:

Supply/return air system

Independent temperature control

Air Conditioning (to be determined on a case by case basis)

Electrical:

Single level switching

High intensity discharge lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

8 duplex receptacles

Duplex receptacle adjacent to each data and video port

Central sound system

Life safety devices per code

Emergency lighting per code

Means of egress lighting per code

Clocks (battery operated solar) with wire guard

Electrical connections to P.E. equipment where necessary

Scoreboard (control outlets in the face of bleachers)

Technology:

2 video ports, 1 monitor with cart

1 voice port

3 data ports

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Painted exposed structure

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

16' of marker board (total)

8' of tack board (total)

Safety wall wainscot

Plumbing:

Fire protection system

Single Unit Dual Height Drinking Fountain

HVAC:

Supply/return air system

Independent temperature control

Electrical:

High intensity discharge lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

6 duplex receptacles

Duplex receptacle adjacent to each data and video
port

Central sound system

Means of egress lighting per code

Emergency lighting per code

Life safety devices per code

Clocks (battery operated solar) with wire guard

Technology:

1 video port

1 voice port

1 data port

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Portland cement plaster

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

Athletic lockers

8' of marker board (total)

8' of tack board (total)

Locker benches

Plumbing:

Fire protection system

Drinking fountain – Dual Height

HVAC:

Supply air system

Exhaust air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

2 duplex receptacles

Emergency lighting per code

Means of egress lighting per code

Central sound system

Life safety devices per code

Clock (battery operated solar)

HS 5.4A Physical Education – Boys- Student Restroom/Shower

Technical Standard

FINISHES :

Flooring:

Restroom: Ceramic mosaic tile or poured epoxy resin

Shower: Ceramic mosaic tile

Base:

Restroom: Ceramic mosaic tile base or epoxy painted

Shower: Ceramic mosaic tile base

Ceiling:

Restroom: Painted portland cement plaster

Shower: Painted portland cement plaster

Walls:

Epoxy-painted concrete masonry units

FEATURES :

Fixed Equipment:

Towel dispensers

24" x 60" mirror

Toilet tissue holders

36" and 42" grab bars

Soap dispensers

Towel hooks

Shower curtain and rod

Toilet partitions

ADA shower accessories

16" x 24" mirrors

Sanitary product dispensers *

Sanitary product receptacles *

Modesty shower partitions *

Plumbing:

Fire protection system

Wall-mounted water closets

Wall-mounted lavatories

Wall-mounted urinals **

ADA shower controls and head

Shower fixtures

HVAC:

Supply/return air system

Exhaust air system

Electrical:

Fluorescent lighting

 Illumination level: See Table 8600-10

 Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Emergency lighting per code

Means of egress lighting per code

Central sound system

Life safety devices per code

* For female designated spaces.

** For male designated spaces.

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Portland cement plaster

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

Athletic lockers

8' of marker board (total)

8' of tack board (total)

Locker benches

Plumbing:

Fire protection system

Drinking fountain – Dual Height

HVAC:

Supply air system

Exhaust air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

2 duplex receptacles

Emergency lighting per code

Means of egress lighting per code

Central sound system

Life safety devices per code

Clock (battery operated solar)

HS 5.5A Physical Education – Girls- Student Restroom/Shower

Technical Standard

FINISHES :

Flooring:

- Restroom: Ceramic mosaic tile or poured epoxy resin
- Shower: Ceramic mosaic tile

Base:

- Restroom: Ceramic mosaic tile base or epoxy painted
- Shower: Ceramic mosaic tile base

Ceiling:

- Restroom: Painted portland cement plaster
- Shower: Painted portland cement plaster

Walls:

- Epoxy-painted concrete masonry units

FEATURES :

Fixed Equipment:

- Towel dispensers

- 24" x 60" mirror
- Toilet tissue holders
- 36" and 42" grab bars
- Soap dispensers

- Towel hooks
- Shower curtain and rod
- Toilet partitions
- ADA shower accessories
- 16" x 24" mirrors
- Sanitary product dispensers *
- Sanitary product receptacles *
- Modesty shower partitions *

Plumbing:

- Fire protection system
- Wall-mounted water closets
- Wall-mounted lavatories
- Wall-mounted urinals **
- ADA shower controls and head
- Shower fixtures

HVAC:

- Supply/return air system
- Exhaust air system

Electrical:

- Fluorescent lighting
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Single level switching
- 4 duplex receptacles
- Emergency lighting per code
- Means of egress lighting per code
- Central sound system
- Life safety devices per code

* For female designated spaces.

** For male designated spaces.

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient base

Ceiling:

Portland cement plaster

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

Athletic lockers

8' of marker board (total)

8' of tack board (total)

Locker benches

Plumbing:

Fire protection system

Drinking fountain – Dual Height

HVAC:

Supply air system

Exhaust air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

2 duplex receptacles

Emergency lighting per code

Means of egress lighting per code

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

Trophy Cases (30 linear feet)

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

8 duplex receptacles

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

Clock (battery operated solar)

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

32' - 48' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
1 duplex receptacle

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient base

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

2' of tall wardrobe

4' of tack board (total)

6' of work surface with file drawers

3' sink base cabinet

9' of wall cabinets (total)

4' of marker board (total)

Towel dispenser

Plumbing:

Fire protection system

Plumbing connections

Sink

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 duplex receptacles

Duplex receptacle adjacent to each data port

Electrical power for ice machine and whirlpool

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 data port near trainer workstation

1 voice port and phone

Technical StandardFINISHE:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

9’ of work surface with file drawers (total)

4’ of marker board

4’ of tack board

2’ of tall wardrobe

6’ of wall cabinets

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to data and
video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

1 video port

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

2' of tall wardrobe

4' of tack board

4' of marker board

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near teacher workstation

1 video port

HS 5.11A Physical Education – P.E. Restroom/Shower

Technical Standard

FINISHES :

Flooring:

Restroom: Ceramic mosaic tile or poured epoxy resin
Shower: Ceramic mosaic tile

Base:

Restroom: Ceramic mosaic tile base or epoxy painted
Shower: Ceramic mosaic tile base

Ceiling:

Restroom: Suspended acoustical
Shower: Painted portland cement plaster

Walls:

Epoxy-painted concrete masonry units

FEATURES :

Fixed Equipment:

Towel dispenser

24" x 60" mirror

Toilet tissue holders

36" and 42" grab bar

Soap dispenser

3 athletic lockers

ADA shower accessories

Plumbing:

Wall-mounted water closet

Wall-mounted lavatory

Wall-mounted urinals **

ADA shower controls and head

Plumbing connections

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

 Illumination level: See Table 8600-10

 Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Central sound system

Life safety devices per code

HS 6.1 **IMC (Library) – Reading/Circulation**

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

15' of circulation desk casework

8' of tack board (total)

Library book shelving- 15 volumes per enrolled student

Interior windows

Window shades

Pencil sharpener support

8' of marker board (total)

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Air Conditioning

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

10 duplex receptacles

Duplex receptacle adjacent to each data and video port

Central sound system

Emergency lighting per code

Means of egress lighting per code

Life safety devices per code

Clock (battery operated solar)

Technology:

2 video ports, monitors, wall or ceiling mounted.

1 voice port and phone at circulation desk

2 data ports for media center automation system

4 data ports for student use

HS 6.2 **IMC (Library) – Student Computer Lab**

Technical Standard

FINISHES :

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units
Studs w/impact board (not at corridors)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

16' of marker board (total)
6' of wall cabinets (total)
6' of base cabinet with heavy duty counter top (total)
8' of tack board (total)

Plumbing:

Fire protection system

HVAC:

Supply/return air system
Independent temperature control
Air Conditioning

Electrical:

Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Multilevel level switching
4 duplex receptacles
Duplex receptacle adjacent to data and
video ports
Emergency lighting per code
Means of egress lighting per code
Central sound system
Life safety devices per code
Clock (battery operated solar)
Receptacle for printer

Technology:

1 video port, monitor, wall or ceiling mounted.
1 voice port and phone
Classroom area network
(25 data ports minimum)

HS 6.3 **IMC (Library) – Periodicals Collection**

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Studs w/impact board (not in corridors)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

Library book shelving

Interior windows

Windows with interior blinds

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Air Conditioning

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section S50-ELECTRICAL – Lighting Design

Multilevel level switching

10 duplex receptacles

Duplex receptacle adjacent to each data and
video port

Central sound system

Emergency lighting per code

Means of egress lighting per code

Life safety devices per code

Clock (battery operated solar)

HS 6.4 IMC (Library) – Technology Equipment Room

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

8' – 14' of tall shelving (total),

84" high, 30" deep

6' – 12' of tall shelving (total),

84" high, 24" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Air Conditioning

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles (minimum)

Technology:

1 voice port and phone

1 data port near workstation

HS 6.5 IMC (Library) – Media Center/Workroom/Copy

Technical Standard

FINISHES :

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Studs w/ impact board (not @ corridors)

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment³:

18' of base cabinets with file drawers (total)

8' of tack board (total)

12' – 16' of tall bookcases (total)

3' – 9' of tall cabinets (total)

Work surface with base cabinets below

18' of wall cabinets (total)

Plumbing:

Fire protection system

Sink

HVAC:

Supply/return air system

Independent temperature control

Air Conditioning

Electrical:

Multi level switching

Fluorescent lighting

 Illumination level: See Table 8600-10

 Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port

1 voice port and phone

2 data ports

4 data ports for student use

HS 6.6 **IMC (Library) – Media Center Office**

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units
Studs w/ impact board

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

Interior window
2' of Tall Wardrobe

Plumbing:

Fire protection system

HVAC:

Supply/return air system
Independent temperature control
Air Conditioning

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
4 duplex receptacles
Duplex receptacle adjacent to data port
Central sound system
Life safety devices per code

Technology:

1 voice port and phone
1 data port near workstation

HS 6.7 IMC (Library) – Student Production and Copy Center

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units
Stud and impact board (not @ corridor)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

18' of base cabinets with file drawers (total)
8' of tack board (total)
12' – 16' of tall bookcases (total)
3' – 9' of tall cabinets (total)
Work surface with base cabinets below
18' of wall cabinets (total)

Plumbing:

Fire protection system

HVAC:

Supply/return air system
Independent temperature control
Air Conditioning

Electrical:

Multi level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
4 duplex receptacles
Duplex receptacle adjacent to each data and
video port
Central sound system
Life safety devices per code
Clock (battery operated solar)

Technology:

1 video port
1 voice port and phone
4 data ports
4 data ports for student use

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 duplex receptacles

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 duplex receptacles

HS 6.10 **IMC (Library) – Conference Room**

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Stud w/ impact board (not @ corridor)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

8' of marker board (total)

8' of tack board (total)

6' of base cabinets (total)

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Air Conditioning

Electrical:

Multilevel switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

3 duplex receptacles

Duplex receptacle adjacent to each data and
video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port, monitor, and brackets

1 voice port and phone

1 data port

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

36' – 80' of open metal shelving (total)

12" deep, 84" high

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 duplex receptacles

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustical wall treatment
(per acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

6 duplex receptacles

Central sound system

Life safety devices per code

Emergency lighting per code

Means of egress lighting per code

Clocks (battery operated solar)

Technology:

1 voice port

4 video ports, monitors, and brackets

Technical Standard

FINISHES:

Flooring:

Quarry tile

Base:

Quarry tile base

Ceiling:

Cleanable, suspended, acoustical

Walls:

Epoxy-painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

Food service equipment

Plumbing:

Connections to food service equipment

Fire protection system

Hand Sink

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Central sound system

4 duplex receptacles

Life safety devices per code

Clock (battery operated solar)

Connections to food service equipment

Emergency lighting

Means of egress lighting per code

Duplex receptacle at each cash register(s)

Technology:

Data port(s) at cash register(s)

Miscellaneous:

GFI outlets at sink areas

Technical Standard

FINISHES :

Flooring:

Quarry tile

Base:

Quarry tile base

Ceiling:

Cleanable, suspended, acoustical

Walls:

Epoxy-painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

Note: 1 Janitor’s closet shall be located w/direct access from kitchen.

FEATURES :

Fixed Equipment:

Food service equipment

Plumbing:

Connections to food service equipment

Plumbing and gas connections

Hand washing lavatory

Fire protection system

3 Basin sink

Grease trap

HVAC:

Supply/return air system

Independent temperature control

Kitchen Canopy Exhaust System

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Central sound system

4 duplex receptacles

Life safety devices per code

Emergency lighting

Connections to food service equipment

Clock (battery operated solar)

Means of egress lighting per code

GFI outlets at sink areas

Miscellaneous:

Fire Extinguishers

Technical Standard

FINISHES:

Flooring:

Quarry tile

Base:

Quarry tile base

Ceiling:

Cleanable, suspended, acoustical

Walls:

Epoxy-painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

Note: 1 Janitor’s closet shall be located w/direct access from kitchen.

FEATURES:

Fixed Equipment:

Food service equipment

Plumbing:

Connections to food service equipment

Plumbing and gas connections

Hand washing lavatory

Fire protection system

3 Basin sink

Grease trap

HVAC:

Supply/return air system

Independent temperature control

Kitchen Canopy Exhaust System

Electrical:

Single level switching

Fluorescent lighting

 Illumination level: See Table 8600-10

 Section D50-ELECTRICAL – Lighting Design

Central sound system

4 duplex receptacles

Life safety devices per code

Emergency lighting

Connections to food service equipment

Clock (battery operated solar)

Means of egress lighting per code

GFI outlets at sink areas

Miscellaneous:

Fire Extinguishers

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

24" x 60" mirror

Lockers 12" x 12" x 60"

Plumbing:

Plumbing connections

Fire protection system

Floor service sink

HVAC:

Exhaust air system

Supplemental heat as required

Dryer vent system

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Life safety devices per code

Central sound system

Connections for washer and dryer

Miscellaneous:

Provide storage cabinet for supplies if required by governing agency.

HS 7.5 **Food Service - Cooks Toilet**

Technical Standard

FINISHES :

Flooring:

Ceramic mosaic tile or poured epoxy resin

Base:

Ceramic mosaic tile or epoxy painted

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

FEATURES :

Fixed Equipment:

Towel dispenser

24" x 60" mirror

Toilet tissue holder

36" x 42" grab bar

Soap dispenser

Plumbing:

Wall-mounted water closet

Wall-mounted lavatory

Plumbing connections

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Life safety devices per code

Central sound system

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

2' of tall wardrobe

4' of tack board

4' of marker board

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to data and
video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

Technical Standard

FINISHES :

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES :

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Technical StandardFINISHE:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

3' sink base cabinet

8' of base and wall cabinets (total)

4' of tack board

Towel dispenser

Plumbing:

Sink

Plumbing connections

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each video port

Receptacles for vending machines, refrigerator,
and microwave

Central sound system

Life safety devices per code

Clock (battery operated solar)

GFI outlet at sink

Technology:

1 video port

1 voice port and phone

Technical StandardFINISHES :

Flooring:

Vinyl composition tile
Carpet aisles

Base:

Resilient base

Ceiling:

Suspended, acoustical
Reflector panels
(per acoustic analysis)

Walls:

Painted concrete masonry units

Diffusing block on back wall
Acoustical wall treatment
(per acoustic analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

Theatre Seating

Plumbing:

Fire protection system

HVAC:

Supply/return air system
Independent temperature control

Electrical:

High intensity discharge lighting
Dimmable quartz lighting
Illumination Level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Theatrical lighting
Multilevel switching with dimming
6 duplex receptacles
Duplex receptacle adjacent to each data and
video port
Central sound system
Auditorium sound system
Assistive listening system
Life safety devices per code
Emergency lighting per code
Means of egress lighting per code
Clocks (battery operated solar)

Technology:

2 voice ports
2 video ports, monitors, and brackets
2 data ports

Technical StandardFINISHES:

Flooring:

Stage: Softwood (painted flat black)
Thrust: Hardwood

Base:

Ventilated resilient base

Ceiling:

Painted (flat black) exposed structure

Walls:

Painted (flat black) concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

Front curtain, track, and valance or grand border
Projection screen
Rear curtain with track
Leg curtains, tracks, and/or pivots
Sound control console receptacle
Lighting control console receptacle
Light pipe
Border curtains
Mid-stage traveler

Plumbing:

Fire protection system

HVAC:

Supply/return air system
Independent temperature control

Electrical:

Fluorescent lighting:
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
Single level switching
Stage dimming system
Theatrical lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL – Lighting Design
6 duplex receptacles
Duplex receptacle adjacent to each data and
video port
Central sound system
Life safety devices per code
Emergency lighting per code
Means of egress lighting per code
Auditorium sound system
Stage outlets

Technology:

2 video ports
2 data ports

Miscellaneous:

8' x 12' coil door to scene shop, storage and
equipment room.

HS 8.3 Performance Space- Scenery Shop

Technical Standard

FINISHES :

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Painted exposed structure

Walls:

Painted concrete masonry units

FEATURES :

Fixed Equipment:

6' - 9' of tall storage cabinets lockable (total)

9' - 12' of tall storage cabinets (total)

4' of tack board

5' - 10' work bench

(2) 8' wide x 10' high overhead door

6' countertop

Plumbing:

Fire protection system

Sink

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Duplex receptacle adjacent to each data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

GFI outlet at sink

Technology:

1 video port

1 voice port

1 data port

Miscellaneous:

8' x 12' coil door to stage.

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient base

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

12'- 16' of 108" high costume storage cabinets

Towel dispenser

8' of tack board (total)

3' sink base cabinet

13' of work surface

48" high makeup mirrors-

full length of work surface

2 minimum 20" wide x 60" high dressing mirrors

Plumbing:

Fire protection system

Sink

Plumbing connections

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting: overhead

Incandescent lighting: over make-up mirrors

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Multilevel switching

2 duplex receptacles

Duplex receptacle at each makeup station
under mirror

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technical StandardFINISHES :

Flooring:

Carpet

Base:

Resilient

Walls:

Painted concrete masonry units

Acoustical wall treatment
(per acoustic analysis)

Acoustic:

Analysis shall be performed in conjunction with
auditoriumFEATURES :

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Dimmable quartz lighting

Theatrical lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

6 duplex receptacles

Duplex receptacle adjacent to each data and
video port

Central sound system

Auditorium sound system

Assistive listening system

Life safety devices per code

Emergency lighting per code

Clocks (battery operated solar)

Technology:

2 data ports

Miscellaneous:

ADA access

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard

Acoustical wall treatment
(per analysis)

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

20' of equipment/work surface

8' of tack board (total)

Operable window

Acoustic wall treatment

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting: overhead

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Dimmable incandescent task lighting
on work surface

Single level switching

4 duplex receptacles

Auditorium Lighting wired through stage
dimmer panel

Provisions for hard-wired equipment

Central sound system

Life safety devices per code

Clock (battery operated solar)

Empty communications conduit with pull cable
from stage for future video projection
control

Auditorium sound system control panel

Stage dimming system control panel

Technology:

1 voice port and phone

1 video port

2 data ports

Miscellaneous:

ADA Access

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Miscellaneous:

8' x 12' coiling door to stage

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient base

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

22' of 108" high costume storage cabinets

4' of tack board (total)

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplementary heat as required

Electrical:

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Central sound system

Life safety devices per code

Miscellaneous:

8' x 12' coiling door to stage

Technical StandardFINISHES¹:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

8 duplex receptacles

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

Technology:

2 voice ports

2 data ports

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

4' of marker board

4' of tack board

2' of tall wardrobe

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting:

 Illumination level: See Table 8600-10

 Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES :

Flooring:

Ceramic mosaic tile

Base:

Ceramic mosaic tile

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

FEATURES :

Fixed Equipment:

Towel dispenser

24"x 60" mirror

Toilet tissue holder

36" and 42" grab bar

Soap dispenser

Plumbing:

Wall-mounted water closet

Wall-mounted lavatory

Plumbing connections

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Central sound system

Life safety devices per code

HS 9.1A Administration- Principal's Restroom

Technical Standard

FINISHES :

Flooring:

Ceramic mosaic tile or poured epoxy resin.

Base:

Ceramic mosaic tile base or epoxy painted

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

FEATURES :

Fixed Equipment:

Towel dispensers

24"x60" mirror

Toilet tissue holders

36" and 42" grab bars

Soap dispensers

Plumbing:

Wall-mounted water closets

Wall-mounted lavatories

Plumbing connections

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL- Lighting Design

1 duplex receptacle

Central sound system

Life safety devices per code

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

4' of marker board

4' of tack board

2' of tall wardrobe

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES :

Flooring:

Ceramic mosaic tile

Base:

Ceramic mosaic tile

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES :

Fixed Equipment:

Towel dispenser

24"x 60" mirror

Toilet tissue holder

36" and 42" grab bar

Soap dispenser

Plumbing:

Wall-mounted water closet

Wall-mounted lavatory

Plumbing connections

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Central sound system

Life safety devices per code

Technical Standard

FINISHES¹:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

4' of marker board

4' of tack board

2' of tall wardrobe

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting:

 Illumination level: See Table 8600-10

 Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to data and video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

1 video port

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

* Provide H.C. access as required by code

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

42” high counter top to waiting area

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Temperature control with reception area

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

3 duplex receptacles

Duplex receptacle adjacent to each data port

Central sound system

Life safety devices per code

Emergency lighting

Clock (battery operated solar)

Technology:

1 voice port and phone at each secretarial workstation

1 fax port

1 data port for printer, 1 video port

Technical StandardFINISHES:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

FEATURES:

Fixed Equipment:

19' of open metal shelving (total)

84" high, 12", 24" or 30" deep

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Temperature control with reception area

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

FEATURES:

Fixed Equipment:

- 10' of base cabinets (total)
- 12' of tall storage cabinets (total)
- 3' sink base cabinets
- 10' of mail cubicles (total)
- 10' of wall cabinets (total)
- Towel dispenser
- 10' of open base cabinets (total)

Plumbing:

- Fire protection system
- Sink
- Plumbing connections

HVAC:

- Supply/return air system
- Independent temperature control

Electrical:

- Single level switching
- Fluorescent lighting:
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- 3 -5 duplex receptacles
- Receptacle for copier
- Central sound system
- Life safety devices per code
- Clock (battery operated solar)

Technology:

- 1 voice port and phone

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.FEATURES:

Fixed Equipment:

Interior windows

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

2 duplex receptacles

Duplex receptacle adjacent to video port

Central sound system

Life safety devices per code

Means of egress lighting per code

Clock (battery operated solar)

Technology:

1 video port, monitor, and brackets

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient base

Ceiling:

Rated 2-hour construction

Walls:

Painted concrete masonry units

Rated 2-hr construction

FEATURES:

Fixed Equipment:

4' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Miscellaneous:

Wall, ceiling, floor and ...?...assemblies shall have
a 2-hour rating

Technical Standard

FINISHES:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

8' of marker board (total)

8' of tack board (total)

6' of base cabinets (total)

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Multilevel switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

3 duplex receptacles

Duplex receptacle adjacent to each data
and video port

Central sound system

Life safety devices per code

Means of egress lighting per code

Clock (battery operated solar)

Technology:

1 video port, monitor, and brackets

1 voice port and phone

1 data port

Technical Standard

FINISHES:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

4' of marker board

4' of tack board

2' of tall wardrobe

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to data and
video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 voice port and phone

1 data port near workstation

1 video port

Technical Standard

FINISHES:

Flooring:

Carpet

Base:

Resilient base

Ceiling:

Suspended, acoustical

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

4' of marker board

4' of tack board

2' of tall wardrobe

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and
video port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

1 video port

1 voice port and phone

1 data port near workstation

Technical Standard

FINISHES:

Flooring:
VCT

Base:
Resilient

Ceiling:
Suspended, acoustical tile

Walls:
Painted gypsum wallboard over metal studs

Acoustics:
Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:
Interior windows

Plumbing:
Fire protection system

HVAC:
Supply/return air system
Independent temperature control

Electrical:
Single level switching
Fluorescent lighting:
Illumination level: See Table 8600-10
Section D50-ELECTRICAL-Lighting Design
2 duplex receptacles
Duplex receptacle adjacent to video port
Central sound system
Life safety devices per code
Means of egress lighting per code
Clock (battery operated solar)

Technology:
T1 1 video port, monitor, and brackets

Technical Standard

FINISHES :

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES :

Fixed Equipment:

42” high counter top to waiting

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Temperature control with reception area

Electrical:

Single level switching

Fluorescent lighting:

 Illumination level: See Table 8600-10

 Section D50-ELECTRICAL-Lighting Design

3 duplex receptacles

Duplex receptacle adjacent to each data port

Central sound system

Life safety devices per code

Emergency lighting

Clock (battery operated solar)

Technology:

1 voice port and phone at each secretarial
workstation

1 fax port

1 data port at each secretarial workstation

1 data port for printer

Technical Standard

FINISHES¹:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES¹:

Fixed Equipment:

8' of marker board (total)

8' of tack board (total)

6' of base cabinets (total)

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Multilevel switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL-Lighting Design

3 duplex receptacles

Duplex receptacle adjacent to each data and
video port

Central sound system

Life safety devices per code

Clock

Technology:

1 video port, monitor, and brackets

1 voice port and phone

1 data port

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

8' of marker board (total)

8' of tack board (total)

Pencil sharpener support

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Multilevel switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL-Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and
video port

Central sound system

Life safety devices per code

Clock (battery, solar)

Technology:

1 voice port and phone

1 data port near teacher workstation

2 data ports (minimum) for student use

1 video port

HS 9.12.6 Administration – Dean of Students - Restroom

Technical Standard

FINISHES :

Flooring:

Ceramic mosaic tile or poured epoxy resin

Base:

Ceramic mosaic tile or epoxy painted

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES :

Fixed Equipment:

Towel dispenser
24"x 60" mirror
Toilet tissue holder
36" and 42" grab bar
Soap dispenser

Plumbing:

Wall-mounted water closet
Wall-mounted lavatory
Plumbing connections
Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting:
 Illumination level: See Table 8600-10
 Section D50-ELECTRICAL – Lighting Design
1 duplex receptacle
Central sound system
Life safety devices per code

Technical Standard

FINISHES:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

9' of work surface with file drawers (total)

4' of marker board

4' of tack board

2' of tall wardrobe

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

4 duplex receptacles

Duplex receptacle adjacent to data and
video port

Central sound system

Life safety devices per code

Technology:

1 voice port and phone

1 data port

1 video port

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

FEATURES:

Fixed Equipment:

19' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL-Lighting Design

1 duplex receptacle

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

FEATURES:

Fixed Equipment:

19' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL-Lighting Design

1 duplex receptacle

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

FEATURES:

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL-Lighting Design

1 duplex receptacle

Technical Standard

FINISHES:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

* Provide H.C. accessibility per code

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

42” high counter top to waiting area

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Temperature control with reception area

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL-Lighting Design

3 duplex receptacles

Duplex receptacle adjacent to each data port

Central sound system

Life safety devices per code

Emergency lighting

Clock (battery, solar)

Technology:

1 voice port and phone at each secretarial
workstation

1 fax port

1 data port for printer

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

Interior windows

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL-Lighting Design

2 duplex receptacles

Duplex receptacle adjacent to video port

Central sound system

Life safety devices per code

Means of egress lighting per code

Clock (battery, solar)

Technology:

1 video port, monitor, and brackets

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient base

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

36' - 80' of open metal shelving (total)

12" deep, 84" high

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL-Lighting Design

Single level switching

2 duplex receptacles

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

4' of tack board

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL-Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and video port

Central sound system

Life safety devices per code

Technology:

1 video port

1 voice port and phone

1 data port near workstation

HS 9.16 Administration- Parent Volunteer Room

Technical Standard

FINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

3' of tack board
2' of tall wardrobe
4' of marker board
4' of tack board
3' sink base cabinet
Towel dispenser

Plumbing:

Sink
Plumbing connections
Fire protection system

HVAC:

Supply/return air system
Independent temperature control

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL-Lighting Design
4 duplex receptacles
Duplex receptacle adjacent to each data and
video port
Central sound system
Life safety devices per code
Clock (battery operated solar)

Technology:

1 video port
1 voice port and phone
1 data port near workstation

Technical StandardFINISHES:

Flooring:

Vinyl Composition Tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

36' – 80' of open metal shelving (total)
12" deep, 84" high

Plumbing:

Fire protection system

HVAC:

Exhaust air system
Supplemental heat as required

Electrical:

Single level switching
Fluorescent lighting
Illumination level: See Table 8600-10
Section D50-ELECTRICAL-Lighting Design
2 duplex receptacles
Clock (battery, solar)

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Fixed Equipment:

10' of base cabinets (total)

12' of tall storage cabinets

3' sink base cabinet

10' of mail cubicles (total)

10' of wall cabinets (total)

Towel dispenser

10' of open base cabinets (total)

Plumbing:

Sink

Plumbing connections

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

2 duplex receptacles

Emergency lighting

Central sound system

Life safety devices per code

Clock (battery, solar)

Technology:

1 voice port and phone

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design StandardsFEATURES:

Fixed Equipment:

6' of base cabinet (total)

3' sink base cabinet

6' of wall cabinets, lockable

Cubicle curtain and track

Towel dispenser

4' of tack board

Plumbing:

Sink

Plumbing connections

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

2 duplex receptacles

Clock (battery, solar)

Emergency lighting

Central sound system

Life safety devices per code

Technology:

1 voice port and phone

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Fixed Equipment:

- 6’ of base cabinet (total)
- 3’ sink base cabinet
- 6’ of wall cabinets, lockable
- Cubicle curtain and track
- Towel dispenser
- 4’ of tack board

Plumbing:

- Sink
- Plumbing connections
- Fire protection system

HVAC:

- Supply/return air system
- Independent temperature control

Electrical:

- Fluorescent lighting
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Single level switching
- 2 duplex receptacles
- Clock (battery, solar)
- Emergency lighting
- Central sound system
- Life safety devices per code

Technology:

- 1 voice port and phone

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design StandardsFEATURES:

Fixed Equipment:

8' of base cabinets w/ 1 sink

1 Paper towel dispenser

Plumbing:

Fire protection system

Plumbing connections

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles

Duplex receptacle adjacent to each data port

Central sound system

Life safety devices per code

Clock (battery, solar)

Receptacle for refrigerator

Technology:

1 voice port per room

Voice port and phone

Technical Standard

FINISHES:

Flooring:

Ceramic Mosaic Tile

Base:

Ceramic Mosaic Tile

Ceiling:

Suspended, acoustical tile

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Fixed Equipment:

- Towel dispenser
- 24” x 60” mirror
- Toilet tissue holder
- 36” and 42” grab bar
- Soap dispenser

Plumbing:

- Wall-mounted water closet
- Wall-mounted lavatory
- Fire protection system
- Plumbing connections

HVAC:

- Exhaust air system
- Supplemental heat as required

Electrical:

- Single level switching
- Fluorescent lighting
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL-Lighting Design
- 1 duplex receptacle
- Central sound system
- Life safety devices per code

HS 9.19.4 Clinic/Nurse's Suite- Restroom

Technical Standard

FINISHES :

Flooring:

Ceramic mosaic tile or poured epoxy resin.

Base:

Ceramic mosaic tile base or epoxy painted

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10- INTERIOR CONSTRUCTION- Acoustical Design Standards.

FEATURES :

Fixed Equipment:

Towel dispensers

24"x60" mirror

Toilet tissue holders

36" and 42" grab bars

Soap dispensers

Plumbing:

Wall-mounted water closets

Wall-mounted lavatories

Plumbing connections

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL- Lighting Design

1 duplex receptacle

Central sound system

Life safety devices per code

Technical Standard

FINISHES:

Flooring:

Vinyl Composition tile

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

Acoustics:

Refer to Technical Standards, C10-INTERIOR
CONSTRUCTION – Acoustical Design Standards

FEATURES:

Fixed Equipment:

4’ of tack board

4’ of marker board

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to each data and
video port

Central sound system

Life safety devices per code

Technology:

1 video port

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES:

Flooring:

Carpet

Base:

Resilient

Ceiling:

Suspended, acoustical tile

Walls:

Painted gypsum wallboard over metal studs

FEATURES:

Fixed Equipment:

Interior windows

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting

Illumination level: See Table 8600-10

Section D50-ELECTRICAL-Lighting Design

2 duplex receptacles

Duplex receptacle adjacent to video port

Central sound system

Life safety devices per code

Means of egress lighting per code

Clock

Technology:

1 video port, monitor, and brackets

Technical Standard

FINISHES:

Flooring:

- Vinyl composition tile
- Stair Treads: Refer to tech specs.
- Ramp: non-slip vinyl composition tile
- Vestibules, entrances, etc:
 - Walk off mats

Base:

- Resilient base

Ceiling:

- Suspended, acoustical

Walls:

- Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

Note: All Corridors shall be as follows:

- Without lockers - 8'-0" minimum clear.
- Lockers on one side - 10'-0" minimum clear from face of wall to face of locker
- Lockers on both sides – 12'-0" minimum clear from face of locker to face of locker

FEATURES:

Fixed Equipment:

- Corridor lockers
- Fire extinguishers and cabinets
- Recessed vinyl floor mats
- Walk off mats

Plumbing:

- Drinking water coolers – Dual Height
- Floor drains at water coolers & walk-off mats

HVAC:

- Supply/return air system
- Temperature control

Electrical:

- Single level switching
- Fluorescent lighting:
 - Illumination level: See Table 8600-10
 - Section D50-ELECTRICAL – Lighting Design
- Duplex receptacles
- Duplex receptacle adjacent to each video port
- Central sound system
- Life safety devices per code
- Means of egress lighting per code
- Emergency lighting
- Clock (battery, operated solar)

Technology:

- Video ports
- Data ports
- Pay phone terminals
- CCTV cameras

Miscellaneous:

- Display cases

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

Open metal shelving (total)

84" high, 12" deep, 24" deep, or 30" deep

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Duplex receptacles

Life safety devices per code

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Painted exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

Sizzors lift.

Plumbing:

Fire protection system

Floor drain

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

 Illumination level: See Table 8600-10

 Section D50-ELECTRICAL – Lighting Design

Duplex receptacles

Technology:

CCTV cameras

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

N/A

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

Open metal shelving

84" high, 12" deep, 24" deep, or 30" deep

Flammable liquid storage locker w/ exhaust

Plumbing:

Fire protection system

Floor drain

Hose bib

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

D50-ELECTRICAL – Lighting Design

Duplex receptacles

Life safety devices per code

Technical Standard

FINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient base

Ceiling:

Suspended, acoustical

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

FEATURES:

Fixed Equipment:

4' of marker board

4' of tack board

Plumbing:

Fire protection system

HVAC:

Supply/return air system

Independent temperature control

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

4 duplex receptacles

Duplex receptacle adjacent to data port

Central sound system

Life safety devices per code

Clock (battery operated solar)

Technology:

Data port for temperature controls computer-tie into bldg data system

1 voice port and phone

1 data port near workstation

Technical StandardFINISHES :

Flooring:

Sealed concrete

Base:

N/A

Ceiling:

Exposed structure

Walls:

Painted concrete masonry units

FEATURES :

Fixed Equipment:

16' - 24' of open metal shelving (total),
84" high, 12" deep, 24" deep, or 30" deep

4- 6 lockers

Mop holder

Plumbing:

Fire protection system

Floor service sink

Floor drain

Hand sink

HVAC:

Supply/return air system

Independent temperature control

Exhaust system

Electrical:

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

Single level switching

4 duplex receptacles (minimum)

Central sound system

Life safety devices per code

Electrical receptacles for custodial equipment

Clock (battery operated solar)

Technology:

1 voice port and phone

Technical Standard

FINISHES:

Flooring:

Sealed concrete

Base:

Resilient

Ceiling:

Suspended Acoustical Tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

Data racks

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Receptacle for data equipment

Technology:

Technology equipment

Technical StandardFINISHES:

Flooring:

Vinyl composition tile

Base:

Resilient

Ceiling:

Cleanable, suspended, acoustical tile

Walls:

Painted concrete masonry units

FEATURES:

Fixed Equipment:

Mop holder

Open shelving

.

Plumbing:

Service sink floor

Plumbing connections

Fire protection system

HVAC:

Exhaust air system

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Technical StandardFINISHES:

Flooring:

Sealed concrete

Base:

Resilient base

Ceiling:

Suspended Acoustical Tile

Walls:

Painted concrete masonry units

FEATURES:

Plumbing:

Fire protection system

HVAC:

Exhaust air system

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Electrical panels

Electrical step down transformer

HS 10.11 Building Support- Public/Student Toilet Rooms

Technical Standard

FINISHES :

Flooring:

Ceramic mosaic tile or poured epoxy resin

Base:

Ceramic mosaic tile or epoxy painted

Ceiling:

Suspended, FRP, acoustical system

Walls:

Painted concrete masonry units

Acoustics:

Refer to Technical Standards, C10-INTERIOR CONSTRUCTION – Acoustical Design Standards.

Provide minimum of one ADA toilet stall. Provide one modified ADA stall for every 5 water closets Exceeding 5 water closets.

* required at female toilet rooms

** required at male toilet rooms

FEATURES:

Fixed Equipment:

Towel dispensers

24" x 60" mirror

Toilet tissue holders

36" and 42" grab bar

Soap dispensers

Toilet partitions

Sanitary product dispenser *

Sanitary product receptacles *

16"x 24" mirrors

Coat Hooks on back of all partition doors.

Plumbing:

Wall-mounted water closets

Wall-mounted urinals (waterless) **

Wall-mounted lavatories

Wall hydrants

Plumbing connections

Fire protection system

Floor drains

HVAC:

Exhaust air system

Supplemental heat as required

Electrical:

Single level switching

Fluorescent lighting:

Illumination level: See Table 8600-10

Section D50-ELECTRICAL – Lighting Design

1 duplex receptacle

Central sound system

Emergency lighting

Life safety devices per code



Philadelphia School
Improvement Team

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Volume #2

Technical Standards

REVISED: MAY 1, 2009

DAMPPROOFING (Division 7)**Technical Standards**

- Detail a dampproof membrane behind all exterior masonry construction.
- Seal joints in sheathing with sealant, secured tar paper, tape, or other suitable membrane material.
- Provide a statement of VOC content for adhesives, sealants, and binders.

Preferred Products

(None)

DRIVEN PILES, BORED/AUGURED PILES, CAISSONS (Division 2)**Design Criteria**

- Use piles or caissons where adequate bearing capacity of soil is too deep to make spread footings practical.
- Use wood piles only where lengths are short and can be determined without significant variation.
- Use steel piles or steel encased concrete piles where depth of adequate bearing capacity is not certain.
- Use caissons where adequate bearing capacity and friction resistance of soil are very low or at considerable depth.
- Do not use caissons in areas of high water table.

Preferred Products

Driven Piles: Franki Piles

EXCAVATION AND FILL (Division 2)**Design Criteria**

- Design slopes in grade rather than retaining walls, where possible.
- Establish building datum elevation to balance cut and fill.
- Establish ground floor datum elevation to be 12" - 18" above adjacent parking lot. Slope drainage of parking lot away from building.

Technical Standards

- Specify that safety regulations related to shoring and other earthmoving operations be strictly followed.
- Specify that placement of backfill shall be done in appropriate lifts and properly compacted.
- Specify any necessary dewatering plan in accordance with OSHA Regulations and Storm water Management requirements.

Preferred Products

(None)

FLUID APPLIED WATERPROOFING (Division 7)**Design Criteria**

- Detail and specify fluid applied waterproofing at the rear portion of exposed masonry parapets and at exterior face of all sub-grade walls. Prior to back fill of sub grade walls, protect the waterproofing with a layer of foundation insulation board.

Technical Standards

- Specify that waterproofing or re-pointing of existing masonry walls shall be executed prior to performing roofing work.
- Provide a Statement of VOC content for adhesives, sealants, and binders

Preferred Products

(None)

FOUNDATION AND LOAD-BEARING ELEMENTS (Division 2)**Design Criteria**

- Consider the following alternatives where soil has low bearing capacity:
 - Use Steel Framing rather than Concrete
 - Use more columns in the building
 - Modify soil for increased capacity with engineered mat fill or crushed stone
- Consider use of more than one footing type where project is massed distinctly different volumes and subject to differential settlement.
- Consider impact of construction techniques, associated with various footing systems, on adjacent occupancies or properties, (noise, vibration, etc.)
- Consider the restrictions of adjacent existing construction with regard to existing footings, sheet shoring or underpinning that may be required.
- Do not design basements on flat sites.
- Consider including a basement where bearing capacity of soil necessitates placing footings at a depth equal to or greater than that of a basement story, but only after a thorough evaluation of the following:

Basements

- As a general rule, the design of basements should be avoided since it is much more expensive than any other space that is above grade. This is understandable for the following reasons:
 - Basement space requires significantly more excavation than that normally required. Excavation costs are high due to the additional time, equipment, and disposal of excavated earth and rock.

- The first floor slab becomes a structural slab that is costlier than a slab on grade.
- Foundation walls and/or grade beams are much deeper and require additional reinforcing.
- Waterproofing of the foundation walls is necessary. Under some circumstances, temporary or permanent site dewatering operations will be necessary.
- Building code requires that basement spaces be sprinkled.
- Elevators need to be extended an additional floor.
- If a basement floor is at or below the level of the sewer main, a sewage ejector will be necessary.
- Possibilities for future expansion of a basement floor are severely restricted due to the extraordinary construction measures that would have to be utilized.

02450 - Foundation and Load-Bearing Elements

Comments

Foundations

Foundation problems are rarely associated with the soil's capacity to hold the weight of the building. Most problems are associated with differential settlement of different building masses or parts, especially those designed and constructed at different times.

If soil of suitable bearing capacity is located close enough to the Earth's surface to preclude deep excavations, spread footings are probably the least expensive foundation system. If the soil bearing capacity is low, basic building design can consider options to reduce concentrated loads in the foundation system. This could include the alternatives of reducing the building's weight by using a steel structural frame instead of concrete, adding columns to the structural grid in order to reduce the load on individual columns, or using a mat or controlled compaction of the soil to increase its capacity enough to allow spread footings.

APPLIED FIREPROOFING (Division 7)

Technical Standards

- Note on drawings and specify fire rating required and not thickness of sprayed-on fireproofing.
- Detail and specify sprayed-on fireproofing for columns where sprayed-on fireproofing is used elsewhere.
- Do not detail or specify concrete encasement of columns for fireproofing.

Preferred Products

W.R. Grace Co.
Cafco Products
Southwest Vermiculite Co., Inc.

FACTORY APPLIED METAL COATINGS (Division 5)**Technical Standards**

- Specify galvanized finish on all miscellaneous framing members not scheduled for other finish.
- Specify red oxide or other suitable primer for miscellaneous framing members that are to be painted.
- Specify finish color of doors to match that of windows.
- Specify SDoP approved colors.
- Do not specify coating of structural steel which is to be embedded in concrete or spray fire-proofed.
- Specify coatings free of lead (Pb) and hexavalent chromium.

Preferred Products

(None)

INSULATING CONCRETE DECKS (Division 3)**Design Criteria**

- Design and specify insulation board on concrete slab in lieu of less thermally efficient insulating concrete.

Technical Standards

- Specify concrete topping to be installed before installation of moveable partitions.
- Specify substrate preparation to be in accordance with concrete topping manufacturer's recommendations.
- Specify product that is self-leveling and can be spread to a feather edge.

Preferred Products

Topping Manufacturer: Dayton Superior Corp.

PLANT PRE-CAST STRUCTURAL CONCRETE (Division 3)**Design Criteria**

- Design totally pre-cast structural systems only after careful consideration of local market conditions and analysis of price competitiveness with other systems.
- Predetermine and document all slab openings in pre-cast concrete components. Field cutting and coring may not be structurally feasible.

Technical Standards

- Specify consultation with Structural Engineer before cutting any pre-cast concrete.
- Specify PCI Certified plant.
- Provide LEED credit submittal documentation for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.

Preferred Products

(None)

REINFORCING STEEL (Division 3)**Design Criteria**

- Design reinforcement to have straight rather than bent bars.
- Design and detail column caps planned for future vertical expansion with a steel plate that future re-bars can be welded to.

Technical Standards

- Specify ASTM A615, grade 60 deformed bars.
- Provide LEED credit submittal documentation for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.

Preferred Products

Recycled, if possible.

B10 Superstructure

ROOF AND DECK INSULATION (Division 7)

Design Criteria

- Design roof drainage by way of varying column heights, structural member bearing elevations and tilting the roof framing.
- Design roof slopes to be a minimum of 1/4" per foot.
- Detail and specify tapered insulation only at small roof areas or where tilting roof framing is not practical.
- Provide LEED credit submittal documentation for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
- Include statement indicating costs for each product having recycled content.

Technical Standards

- Specify and detail board insulation. Do not specify poured or batt insulation. Perimeter of each roof area shall have the abutting insulation mechanically attached to the roof deck.

Preferred Products

Robertson, a United Dominion Co.
Roof Deck, Inc.
United Steel Deck, Inc.
Vulcraft, Division of Nucor Corp.

SHEET METAL FLASHING AND TRIM (Division 7)**Technical Standards**

- Specify stainless steel for flashing and trim applications requiring superior, long term performance.
- Do not specify galvanized sheet steel for flashing and trim. (Specify only if project budget absolutely necessitates it.)
- Specifying Sisal craft impregnated felt or other proven non-metallic materials is acceptable in thru-wall applications.

Preferred Products

(None)

07600 - Flashing and Sheet Metal**Comments**

Like the roofing membrane, flashing is a major source of building water leaks. They require special attention. Metals such as copper or stainless steel provide the greatest longevity of service. Stainless steel is the preference of first choice. However, their expense may be too costly for most projects. Prices fluctuate and should be checked. Also, compatibility of these materials with existing flashing materials may be an issue.

Aluminum is a very good material for flashing and counter flashing and such applications are also compatible with copings and gravel stops that are usually made of aluminum.

Galvanized and painted sheet metal is not nearly as long lasting and should not be specified. (Specify only in applications that are expected to have relatively short service or when budget considerations are extremely severe.)

Non-metallic flashing materials, such as Sisal craft impregnated felt, are satisfactory for through wall flashing or other totally embedded applications.

Flashing details and specifications should follow the roofing manufacturer's recommendations or follow the National Roofing Contractors' Association (NRCA) recommended standard details. They are the ultimate authority on this subject.

STEEL DECKING (Division 5)**Design Criteria**

- Design in conformance with Steel Deck Institute (SDI) *“Design Manual for Floor Decks and Roof Decks”*.

Technical Standards

- Specify gauge of deck to be heavy enough to carry wet concrete, precluding necessity of centering.
- Specify galvanizing of floor decks only when required by a UL Rating. Consider specifying a contractor's option for paint, in lieu of galvanizing.
- Check roof deck flute dimension to be certain that insulation board will span the width.
- Specify galvanized or painted deck throughout any project that is clad with pre-cast concrete.
- Provide LEED credit submittal documentation for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.

Preferred Products

(None)

STRUCTURAL STEEL (Division 5)**Design Criteria**

- Design structural framing with ASTM A572, Grade 50 steel. Use higher strength steel only at locations that require it. Use A-36 steel for miscellaneous metal.
- Design building forms to be framed in simple ways with as few pieces as possible.
- Provide LEED credit submittal documentation for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
 - Include statement indicating costs for each product having recycled content.

Preferred Products

Domestic Steel

STRUCTURAL CONCRETE (Division 3)**Design Criteria**

- Consider flat slab construction only where relatively close column spacing is acceptable.
- Consider pre-cast beams and poured-in-place slabs compared to cost of other systems.
- Consider one-way pan system in comparison to steel systems, with caution, regarding locations of ribs and sleeved openings.
- Consider designing 2 hour rated, 4 ½" floor slabs as a lighter weight composite of 2 ½" of concrete plus 2" of sprayed-on fireproofing, with caution, regarding vibration.
- Consider designing 1 ½ hour fire rated roof slabs as 3" slab construction.
- Design ground floor perimeter beams and columns to carry full bay loading, as consideration for future expansion, where possible.
- Specify concrete hardener for all unfinished horizontal concrete surfaces exposed to traffic.
- Provide LEED credit submittals for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
 - Include statement indicating costs for each produce having recycled content.
- Provide LEED credit submittals for each concrete mixture containing fly ash as a replacement for Portland cement or other Portland cement replacements and for equivalent concrete mixtures that do not contain Portland cement replacements.

Preferred Products

(None)

ACCESS DOORS AND PANELS (Division 8)

- Specify that access doors and panels are to be provided by contractor whose equipment is to be accessed, when the bid packages are multiple primes.
- Specify that painting of all access doors and panels is in the scope of General Contractor's painting work, when the bid packages are multiple primes.

Preferred Products

J.L. Industries, Inc.
Karp Associates, Inc.
Larsen's Manufacturing Co.
Milcor Limited Partnership
Nystrom Building Products Co.

Aluminum Storefront (Division 8)

Design Criteria

- Design wide stile aluminum entrance doors with sidelights and transom's at main entrances.
- Design frames with superior strength rugged, one-piece aluminum extrusions of aluminum alloy with a minimum 3/16" wall thickness.
- Design doors with superior strength rugged, one-piece aluminum extrusions of aluminum alloy with a minimum 3/16" wall thickness.
- Design Wide stile, 6" vertical face dimension, 1 3/4" depth, 3/16" wall thickness door and frame for high traffic and high abuse applications. 6" Top Rails and 10" bottom rails to comply with ADA.

Technical Standards

- Specify 1 3/4" doors with extruded aluminum alloy stiles and rails and integral weather-stripping.
- Specify doors with 6 inch mid rails, which add to the strength and stability of the door and allow for attachment of high stress hardware.
- Specify doors that are mechanically joined and welded
- Specify doors with 1/4" to 1" standard glazing and insulated glass with Low E coating.
- Specify doors with hardware that is factory installed and specified in the door hardware section.
- Specify doors with the necessary drop plates, brackets and spacers to allow the correct installation of the finish hardware.
- Specify doors with surface mounted hardware including continuous hinges at all aluminum entrance doors.
- Specify frames with one-piece aluminum extrusions mechanically joined. Provide thermally broken frames.

- Specify frames with integral weather-stripping.
Design frames that are 1 ¾ x 4 ½ or wider to accommodate thermal, wind, weather and structural demands.
- Design doors and matching aluminum framing with Class 1 anodized aluminum finish.
- Hardware to be as indicated in section *Builders Hardware*.
- Give preference to products manufactured within 500 miles of project
- Give preference to products with post consumer and post industrial \recycled content
- Provide statement of VOC content for adhesives and sealants

Preferred Products

Kawneer Company
Efco Corporation
YKK America

B 20 Exterior Enclosure

ALUMINUM WINDOW SECURITY SCREENS (Division 8)

Design Criteria

- Design Heavy Duty Aluminum Security/Vandal **Window Screens** and sub-frames to be field mounted to existing and/or new aluminum windows.
- Aluminum Window Screens** shall be installed at all exterior window locations as directed by the School District of Philadelphia and/or the Philadelphia School Improvement Team (PSIT).
- Design all Aluminum Window Screens with a minimum of **two side-mounted hinges** located on the jamb side opposite the operating mechanisms so that the Screens will swing out towards the exterior side of the building.

Technical Standards

- Specify Aluminum sub-frame and operable Security/Vandal Window Screens to be extruded aluminum, commercial quality 6063-T5 alloy with **classification grade** to be AAMA Grade HC.
- Specify Security Screen In-fill to be 0.028 stainless steel 12 x 12 **black power coat finished mesh**.
- Specify **paint finish** to be an organic finish applied over five-stage aluminum pre-treatment. Screen frames and screen sash shall be factory finished to match window frame and shall conform to AAMA 2604.

Preferred Products

Screen Manufacturers:

Graham Architectural Products
Peerless Products, Inc.
Traco Window Company
Kane Screens

B 20 Exterior Enclosure

ALUMINUM WINDOWS (Division 8)

Design Criteria

- Design **hopper vent** windows (bottom-hinged, swing-in), with lever handle or pull if mounting height is 6'-0" or less. If more than 6'-0", specify eye for pole operation.
- Design **fixed sash** windows with 4" deep frames.
- Design and specify all window units to permit both sides of glass to be cleaned from the interior.
- Window type, construction materials, and operation method must be pre-authorized by the Director of Design prior to any such product being incorporated into the design of any new construction or window replacement project.

Technical Standards

- Specify window **classification grade** to be AAMA Grade HC.
- Specify that all operating sash, not scheduled to receive exterior wire guards, shall be equipped with **limit stops**, that limit opening to 10" maximum, except in the following locations:
 - Areaways
 - 2 windows at basement level of a light well
 - Main administrative office
 - Other administrative offices
 - Principal's office
- Specify aluminum wire fabric **insect screen** inserts at operating window units in the following locations:
 - Cafeterias and Food Preparation Areas
 - Lounges
 - Medical Rooms
- Specify a **thermal break** in aluminum windows.
- Specify fixed (non-glass) **window panels** shall be porcelain enamel on 24 gauge steel with extruded polystyrene insulation.

Preferred Products

Window Manufacturers:

- Graham Architectural Products
- Milco
- Peerless Products, Inc.
- EFCO Corporation
- Traco Window Company
- Riverview
- Winco Aluminum Windows
- Architectural Window

Revised March 25, 2011

Panel Manufacturers: Alliance Wall Corporation
Greensteel Corporation

B 20 Exterior Enclosures

BIRD SCREENS (Division 10)

Design Criteria

- Design and specify galvanized steel bird screens at all HVAC air intake grilles.
- Give preference to products manufactured within 500 miles of project.
- Give preference to products with post consumer and post industrial recycled content.
- Specify that screening device shall limit penetration of a ½” probe.

Preferred Products

(None)

BRICK MASONRY (Division 4)**Design Criteria**

- Consider designing cavity walls with 2" cavities and 3/4" rigid insulation applied to the inside face of the cavities.
- Brick for new building construction, and where a match is not required on existing construction, shall be utility brick (nominal 12"x4"x4") laid in thirds or Jumbo brick (16"x4"x4") laid in running bond.
- Minimize design of pilasters, soldier courses, and other such labor intensive features.
- Limit brick patterns, created by use of different colored bricks, to two colors.
- Consider multiple floor vertical spans of masonry to minimize supporting steel.
- Preclude necessity of cut bricks over lintels.
- Do not use cored bricks over lintels or for sills.

Technical Standards

- Specify mortar strength shall be 1800 psi, minimum.
- Do not specify additives. Control color of mortar by specifying color of sand. Do not specify cold weather additives or plasticizers.
- Specify temperature ranges for installation.
- Specify that masonry work be performed during non-freezing days.
- Brick to extend 8" into grade.
- Give preference to products manufactured within 500 miles of project.

Preferred Products
(None)

B 20 Exterior Enclosures

CAST STONE (Division 4)

- Consider use of cast stone in lieu of marble, limestone, or other cut stones used as decorative features in exterior walls.
- Give preference to products manufactured within 500 miles of project.
- Provide LEED credit submittal documentation indicating location of product manufacturing, extraction and processing of materials, including costs.

NOTE: This is permitted only where existing building construction is being matched. New construction shall not utilize cast stone, marble, limestone or other stone.

Preferred Products

- Cast stone may be made with post-consumer or post-industrial recycled content.

GranCem by St. Lawrence Cement, Albany, NY

B 20 Exterior Enclosures

CONCRETE MASONRY UNITS (Division 4)

Design Criteria

- Design corridor partitions as CMU.
- Design fire rated partitions as CMU.
- Consider use of Acoustical CMU in cafeterias and other high decibel areas.
- Design and specify glazed CMU as base for CMU walls.

Technical Standards

- Specify CMU back-up to brick masonry as either 6" standard weight or 8" lightweight, depending on cost advantage.
- Specify horizontal masonry ties at every two courses between brick and CMU.
- Specify horizontal reinforcing in exterior walls to be every two courses of CMU.
- Carefully consider both Horizontal and vertical coursing of CMU to minimize field cutting.
- Specify curing period for CMU to be 28 days, minimum.
- Consider use of CMU thickness greater than 12 inch (note: many manufacturers produce 14 & 16 inch units) in lieu of 2 wythe construction where code conditions will permit.
- Provide solid or grouted units at the course above and below any change in unit widths, number of wythes and/or corbels.

Provide LEED credit submittal documentation indicating location of product manufacturing, extraction and processing of materials, including costs.

Preferred Products

(None)

Door Hardware (Division 8)**Technical Standards**

- Specify hardware sets. Require qualified supplier to develop hardware schedule.
- Specify commercial grade 1 hardware.
- Specify that manufacturer's nameplate shall be omitted from products.
- Coordinate specification of new hardware with existing.
- Specify matching finishes of new and existing hardware.

Continuous and Butt Hinges

- Specify heavy duty inset continuous hinges on all exterior aluminum and FRP doors similar to McKinney MCK14HD. Hinges to match the color of the door.
- Specify heavy duty 5 knuckle butt hinges on all high use doors including classroom, bathroom, corridor, and stair tower, similar to McKinney TA386. Hinges to match the color of the balance of the hardware.
- Specify standard duty 5 knuckle butt hinges on infrequently used doors including mechanical rooms, offices, closets and administration areas similar to McKinney TA714. Hinges to match the color of the balance of the hardware.
- Specify NRP non rising pins for all interior steel outswing doors. Provide SSF security stud feature for all exterior steel outswing doors
- Specify hinges and pins to be stainless steel at exterior locations, boiler rooms, kitchens, swimming pools, and other wet atmosphere areas.

Locks and Latches

- Specify extra heavy duty BHMA grade 1 cylindrical locks
- Specify a single lock chassis to accommodate 1 ¾ to 2 ¼ inch door thickness.
- Specify locksets to have solid cast levers without plastic inserts.
- Specify that when the outside lever is locked, it shall rotate freely and return to its horizontal position to assure vandal resistance (lever release or free wheeling).
- Specify a single lockset shall be able to accommodate a six pin or seven pin conventional cylinder.
- Specify locksets shall carry a five year limited warranty
- Specify a double cylinder intruder classroom function lock at all classroom entrances. The interior levers of these locks shall be marked with a key turn indicator to help assure remote locking of the outside lever from the inside.
- Specify special security locks at computer rooms, special storage rooms, and any rooms where money or confidential material may be kept. Specify mortise locks with vandal resistant trim. Beveled trim escutcheon to be 5/16 inch thick stainless steel, have mounting screws inserted from both sides and incorporates floating spindles.
- Do not specify lever trim at exterior side of exterior doors.

Cylinders and Keys

- Specify cylinders that employ a utility patent pending mechanism that requires the use of a patented key and furnished with a minimum of seven pins.
- Specify cylinders that have a locking pin mechanism, which engages a blocking plate and prevents the plug from turning.
- Specify keys that have a control pin that depresses the locking mechanism and allows the plug to turn.
- Specify patented key system that has a patent life until 2018
- Specify a key system that does not require the need for special keying or key cutting equipment.

- Specify keys made from nickel silver that are stronger and thicker than conventional keys and have a larger key bow than conventional keys.
- Specify 6 of each master key and 3 keys per cylinder at each school.
- Specify removable core cylinders on the exterior of the building and traditional cylinders on the interior.
- Specify a Key system that is independent and not have the ability to be keyed into a conventional key system or cross keyed.
- Specify Keys and cylinders that are covered by a five year warranty.
- Provide a BHMA grade 1 wall mounted key control cabinet with hinged panel door, including a two tag system with key holding hooks, self locking key holders, labels, envelopes, key tags, markers and a capacity able to hold 150% of the number of locks.
- Specify a “Best” cylinder be provided at openings designated as “Best Openings”

Exit Devices and Mullions

- Specify BHMA grade 1 exit devices on all doors requiring an exit device.
- Specify rim exit devices on all exterior single doors.
- Specify rim exit devices with key removable mullions on all exterior pairs of doors.
- Specify devices with cylinder dogging at all main entrances and devices less dogging at all other exterior openings.
- Specify one exterior cylinder for a single or per pair on each main entrance.
- Supply pulls only at doors with cylinders. Specify only one door pull on a pair of doors.
- Specify surface vertical rod exit devices, less bottom rod, on interior pairs of doors that are less than 64 inches in width. Supply rod guards to protect the top rods.

- Specify exit devices with chassis made from heavy duty cold forged electroplated steel. Cast chassis will not be accepted.
- Specify an exit device that uses ¼ inch attaching screws to mount the device to the door, and tamper proof screws attaching the chassis and end covers.
- Specify an exit device that uses true architectural brass, bronze, chrome or stainless steel finishes. Stainless steel shall be specified unless the finish is otherwise noted.
- Specify an exit device that incorporates a ¾ inch deadbolt style latchbolt with positive deadlocking by the auxiliary bolt. Pullman type latchbolts and devices without deadlatching will not be acceptable.
- Specify that end caps on exit devices be metal, (preferably stainless steel.) and attach with a minimum of 3 screws.
- Specify rim exit devices with key removable mullions on all interior pairs of doors with rim exit devices.
- Specify heavy duty lever trim at any interior opening with an exit device. Trim shall have free wheeling levers for vandal resistance, beveled sides and a flush cylinder for attack resistance and heavy duty threaded posts with ¼ inch attaching screws.
- Provide exit devices and trim by the same manufacturer and have a written five year warranty.
- Use of tec type self drilling screws, unless provided by the manufacturer, with the hardware is prohibited.

Door Closers

- Specify BHMA grade 1 door closers for interior and exterior doors that are surface mounted, have corrosion resistant cast aluminum bodies with a 2 1/8 inch projection and have a powder coated finish to match the surrounding hardware.
- Specify door closers that have a rack and pinion design with two teeth engagement and a 1 ½ inch diameter piston.
- Specify door closers that have standard, separate and independent non critical adjustment valves for latch speed, sweep speed, backcheck and backcheck intensity.

- Specify door closers that are capable of adjusting the spring size 1 thru 6 and contains all season fluid that increases lubricity and minimizes seasonal adjustments, standard.
- Specify at exterior doors a parallel arm that combines the features of a double lever arm and overhead door stop (Unitrol) with the backcheck feature of the door closer to prevent door stop shock loads. Spring Cush type arms are not acceptable. The combination of a heavy duty parallel arm in conjunction with a heavy duty overhead stop will be allowed.
- Specify parallel rigid arms at all applications requiring parallel arms.
- Specify all door closers with a metal cover.
- Use of tec type self drilling screws, unless provided by the manufacturer with the hardware, is prohibited.
- Specify door closers that have a life of the building warranty for the closer body and a 10 year warranty for all arms.

Stops and Holders

- Specify cast wall and floor stops for each door. All doors shall be furnished with an auxiliary stop. An overhead, wall or floor stop, shall be furnished whether scheduled or not, and as is found typically scheduled in the balance of the hardware sets. If no door stop is scheduled (or if no specialized auxiliary door closer arm is listed), supplier shall provide an auxiliary stop, overhead, wall (or floor) stop for every door, which opens and impacts or opens into any fixed structure.
- Specify Wall stops that have a metal encased rubber design with an anti vandal feature that incorporates an imbedded steel washer in the rubber portion to prevent the bumper from being removed from the wall.
- Specify Universal Dome floor Stop that is capable of stopping a door in both a low rise and a high rise condition. Floor stops shall have the lip of a low rise bumper and the dome of a high rise bumper.
- Specify magnetic holders that are capable of holding a door in a floor or wall application has a triple voltage coil that has the capability of working with 12, 24 or 120 vac/dc and has an assortment of extensions that may be used to accommodate various applications.

Door Bolts and coordinators

- Specify BHMA grade 1 flush bolts, surface bolts, automatic and self latching flush bolts as required for non labeled openings and to comply with labeled fire door requirements.
- Specify a 12 inch rod for doors up to 84 inches and longer rods as necessary for taller doors.
- Specify door coordinators with carry bars where automatic and self latching bolts are used.

Door Trim

- Specify a “Z” shaped anti vandal stainless steel pull on exterior Hollow Metal doors, which have an exit device on the inside and require re-entry with a key by cylinder. Pulls shall have a polymer coating to protect the outside pull area from extreme heat and cold. Pulls should be thru-bolted directly to the exit device.
- Specify Push plates that are 6” x 16” and beveled on four sides.
- Specify Pulls that are 8 inches in length and mounted with a 4” x 16” push plate.
- Specify pulls that are handicap accessible.

Protective Trim

- Specify kick plates as stainless steel, on hollow metal doors and on wood veneer doors. Kickplates to be 8 inches high .050 thickness and beveled on four sides.
- Specify armor plates on areas that require extra protection from door damage including loading dock areas, kitchen areas or any place doors are subject to damage from carts and hand trucks. Armor plates are to be 36 inches tall or as label requirements dictate .050 thickness and beveled on four edges.

Weatherstrip

- Specify ¼ inch high, aluminum thresholds with a lip containing a neoprene bulb insert on all exterior openings. Threshold to be 5" in width.
- Specify ¼ inch high flat thresholds on all interior stair tower doors. Thresholds to be as wide as the frame depth.
- Specify rigid jamb aluminum weatherstrip, with a neoprene bulb, at all exterior openings. Weatherstrip shall have the ability to be adjusted and cover gaps up to 1/8th of an inch.
- Specify stick-on weather-strip on all mullion faces where they come in contact with the door.
- Specify rigid aluminum sweeps with a neoprene seal and have the ability to cover gaps up to ½ of an inch.
- Specify 2 inch projecting aluminum rain drips on exterior doors that are not under cover.
- Specify the finish of the weather-strip to match the door and frame color.

General notes

- Specify that any existing special locking or security devices removed during alteration work shall be reinstalled.
- Indicate modification of exterior door sill substrates, if necessary to accommodate proper installation of threshold.
- Specify that the hardware installers be certified installers and attend an installation seminar provided by the manufacturer's representative.
- Specify that Contractor provide instruction of SDOP personnel about adjustment and maintenance of hardware.
- Specify submission of manufacturer representative's address and telephone number for each type of hardware installed, to SDOP field inspector, as part of close-out submittals package.
- Specify the following hardware sets and indicate on door schedule.

- Use hardware set numbers for each project only as listed in this master. If any particular hardware set is not used, show that set number in the schedule and indicate as “NOT USED”.

Acceptable Manufacturers

Acceptable manufacturers listed are subject to compliance with the requirements of this document and must meet the criteria of the standards as listed herein. Manufacturers offering products that may be incorporated in this work shall reflect the standard of the Philadelphia School District and are limited to the following.

Butt Hinges	McKinney, Bommer
Continuous Hinges	McKinney, Pemko
Cylindrical Locks	Corbin Russwin CL3300
Security locks	Corbin Russwin ML2000 x Vandal Resistant Trim
Exit Devices	Corbin Russwin Secure Bolt ED5200S
Cylinders	Corbin Russwin Pyramid 7 pin Patented Security
Door Closers	Norton Unitrol 7500, Yale Unitrol 4400
Wall Stops	Trimco, Burns
Magnetic holders	Rixson, Sargent
Electric Strikes	Folger Adam
Electronic Accessories	Folger Adam
Pull Trim	Trimco, Burns
Protection plates	Trimco, Burns
Weatherstrip	Pemko, Reese

FINISH HARDWARE SETS

Hardware Set 1

Exterior HM–Pair Doors - Rim x Mullion – Ingress/Egress Best Door *Should Key Pad be added?*

Each Pair to Receive:

2 ea Cont Hinges	MCK-25HD	628	Mc Kinney
1 ea Exit Device	ED5200S x M52 x K157 RHR Dr.	630	Corbin-Russwin
1 ea Exit Device	ED5200S M52 LHR Dr.	630	Corbin-Russwin
1 ea Mullion	707A KM x M57	USP	Corbin-Russwin
1 ea Cylinder	1E72 RHR Dr.	626	Best Type
2 ea Cylinder	1E74 Mullion, Dogging	626	Best Type
2 ea Door Closers	UNI-7500M x Reinf. Brackets	Alum	Norton
1 ea Pulls	1097HA SP	630	Trimco
2 ea Kick Plates	8” x 2” LDW x .050 Push Side Mount	630	Trimco
1 ea Threshold	2005AN	Alum	Pemko
2 ea Sweeps	315DN	Neoprene	Pemko
1 set Weatherstrip	303DS Head and Jambs	Silicone	Pemko
1 set Weatherstrip	PK33D Mullion	Silicone	Pemko

1	ea Rain Drip	346D full width of frame	Alum	Pemko
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Hardware Set 2

Exterior HM–Pair Doors - Rim x Mullion –Egress Only

Each Pair to Receive:

2	ea Cont Hinges	MCK-25HD	628	Mc Kinney
2	ea Exit Device	ED5200S	630	Corbin-Russwin
1	ea Mullion	707A KM x M57	USP	Corbin-Russwin
1	ea Cylinder	1030.118 Mullion	626	Corbin-Russwin
2	ea Door Closers	UNI-7500M x Reinf. Brackets	Alum	Norton
2	ea Kick Plates	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1	ea Threshold	2005AN	Alum	Pemko
2	ea Sweeps	315DN	Neoprene	Pemko
1	set Weatherstrip	303DS Head and Jambs	Silicone	Pemko
1	set Weatherstrip	PK33D Mullion	Silicone	Pemko
1	ea Rain Drip	346D full width of frame	Alum	Pemko

Hardware Set 3

Exterior Alum/FRP–Pair Doors - Rim x Mullion – Ingress/Egress

Each Pair to Receive:

2	ea Cont Hinges	MCK-25HD	628	Mc Kinney
1	ea Exit Device	ED5200S x M52 x K157 RHR Dr.	630	Corbin-Russwin
1	ea Exit Device	ED5200S x M52 LHR Dr.	630	Corbin-Russwin
1	ea Mullion	707A KM x M57	USP	Corbin-Russwin
1	ea Cylinder	3030.RHR Dr.	626	Corbin-Russwin
3	ea Cylinder	1030.118 Mullion & Dogging	626	Corbin-Russwin
2	ea Door Closers	UNI-7500M x Reinf. Brackets	Alum	Norton
2	ea Pulls	7191 x 10" RHR Door	630	Trimco
2	ea Kick Plates	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1	ea Threshold	2005AN	Alum	Pemko
2	ea Sweeps	315DN	Neoprene	Pemko
1	set Weatherstrip	303DS Head and Jambs	Silicone	Pemko
1	set Weatherstrip	PK33D Mullion	Silicone	Pemko
1	ea Rain Drip	346D full width of frame	Alum	Pemko

Note: On FRP doors flush pull provided by FRP door manufacturer.

Hardware Set 4

Exterior Alum/FRP–Pair Doors - Rim x Mullion –Egress Only

Each Pair to Receive:

2	ea Cont Hinges	MCK-25HD	628	Mc Kinney
2	ea Exit Device	ED5200S x M51	630	Corbin-Russwin
1	ea Mullion	707A KM x M55	USP	Corbin-Russwin
1	ea Cylinder	1030.118 Mullion	626	Corbin-Russwin
2	ea Door Closers	UNI-7500M x Reinf. Brackets	Alum	Norton
2	ea Kick Plates	8" x 2" LDW x .050 Push Side Mount	630	Trimco

1	ea	Threshold	2005AN	Alum	Pemko
2	ea	Sweeps	315DN	Neoprene	Pemko
1	set	Weatherstrip	303DS Head and Jambs	Silicone	Pemko
1	set	Weatherstrip	PK33D Mullion	Silicone	Pemko
1	ea	Rain Drip	346D full width of frame	Alum	Pemko

Hardware Set 5

Exterior – HM Single Door –Rim Exit Device – Egress Only

Each Door to Receive:

1	ea	Cont Hinge	MCK-25HD	628	Mc Kinney
1	ea	Exit Device	ED5200S x M51	630	Corbin-Russwin
1	ea	Door Closer	UNI-7500M x Reinf. Brackets	Alum	Norton
1	ea	Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1	ea	Threshold	2005AN	Alum	Pemko
1	ea	Sweep	315DN	Alum	Pemko
1	set	Weatherstrip	303DS Head and Jambs	Silicone	Pemko
1	ea	Rain Drip	346D full width of frame	Alum	Pemko

Hardware Set 6

Exterior – HM Single Door –Rim Exit Device – Ingress/Egress Best Door

Each Door to Receive:

1	ea	Cont Hinge	MCK-25HD	628	Mc Kinney
1	ea	Exit Device	ED5200S x M52	630	Corbin-Russwin
1	ea	Cylinder	1E72	626	Best Type
1	ea	Cylinder	1E74 Dogging	626	Best Type
1	ea	Pulls	1097HA SP	630	Trimco
1	ea	Door Closer	UNI-7500M x Reinf. Brackets	Alum	Norton
1	ea	Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1	ea	Threshold	2005AN	Alum	Pemko
1	ea	Sweep	315DN	Alum	Pemko
1	set	Weatherstrip	303DS Head and Jambs	Silicone	Pemko
1	ea	Rain Drip	346D full width of frame	Alum	Pemko

Hardware Set 7

Exterior – HM UL Single Door –Rim Exit Device – Exit Only

Each Door to Receive:

1	ea	Cont Hinge	MCK-25HD	628	Mc Kinney
1	ea	Exit Device	ED5200SA	630	Corbin-Russwin
1	ea	Door Closer	UNI-7500M x Reinf. Brackets	Alum	Norton
1	ea	Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1	ea	Threshold	2005AN	Alum	Pemko
1	ea	Sweep	315DN	Alum	Pemko
1	set	Weatherstrip	303DS Head and Jambs	Silicone	Pemko
1	ea	Rain Drip	346D full width of frame	Alum	Pemko

Hardware Set 8

Exterior Alum/FRP–Single Door - Rim– Ingress/Egress

Each Pair to Receive:

1 ea Cont Hinges	MCK-25HD	628	Mc Kinney
1 ea Exit Device	ED5200S x K157 RHR Dr.	630	Corbin-Russwin
1 ea Cylinder	3030	626	Corbin-Russwin
1 ea Door Closers	UNI-7500M x Reinf. Brackets	Alum	Norton
1 ea Pulls	7191 x 10" RHR Door	630	Trimco
1 ea Kick Plates	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1 ea Threshold	2005AN	Alum	Pemko
1 ea Sweeps	315DN	Neoprene	Pemko
1 set Weatherstrip	303DS Head and Jambs	Silicone	Pemko
1 set Weatherstrip	PK33D Mullion	Silicone	Pemko
1 ea Rain Drip	346D full width of frame	Alum	Pemko

Note: On FRP doors flush pull provided by FRP door manufacturer.

Hardware Set 9

Exterior Alum/FRP–Single Door - Rim–Egress Only

Each Pair to Receive:

1 ea Cont Hinges	MCK-25HD	628	Mc Kinney
1 ea Exit Device	ED5200S x M51	630	Corbin-Russwin
1 ea Door Closers	UNI-7500M x Reinf. Brackets	Alum	Norton
1 ea Kick Plates	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1 ea Threshold	2005AN	Alum	Pemko
1 ea Sweeps	315DN	Neoprene	Pemko
1 set Weatherstrip	303DS Head and Jambs	Silicone	Pemko
1 set Weatherstrip	PK33D Mullion	Silicone	Pemko
1 ea Rain Drip	346D full width of frame	Alum	Pemko

Note: On FRP doors flush pull provided by FRP door manufacturer.

Hardware Set 10

Interior HM/WD UL Pair Rim x Mullion - Ingress/Egress

Each Pair to Receive:

6 ea Hinges	T4A3786 4 ½ x 4 ½ NRP	626	Mc Kinney
2 ea Exit Device	ED5200SA x PR955	630	Corbin-Russwin
1 ea Mullion	707A KM x M55	USP	Corbin-Russwin
2 ea Cylinder	3030.RHR Dr.	626	Corbin-Russwin
1 ea Cylinder	1030.RHR Dr.	626	Corbin-Russwin
2 ea Door Closers	PR7500M x Reinf. Brackets	Alum	Norton
2 ea Kick Plates	8" x 2" LDW x .050 Push Side Mount	630	Trimco
2 ea Stops	1270CVSV	630	Trimco
2 set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 11

Interior HM/WD UL Pair Doors SVR Exit Device LBR– Ingress/Egress

Each Pair to Receive:

6 ea Hinges	T4A3786 4 ½ x 4 ½	626	Mc Kinney
2 ea Exit Devices	ED5470B X x M55 x PR955	630	Corbin-Russwin

2	ea	Rod Guards	Protect Top Rods and Latch	630	Trimco
2	ea	Cylinder	3030.RHR Dr.	626	Corbin-Russwin
2	ea	Door Closers	PR7500M x Reinf. Brackets	Alum	Norton
2	ea	Kick Plates	8" x 2" LDW x .050 Push Side Mount	630	Trimco
2	ea	Stops	1270CVSV	630	Trimco
2	ea	Magnetic Holders		997	689
1	set	Seals	PK33BL full Perimeter	Silicon	Pemko

Note: Supply correct magnetic holder for each wall condition.

Hardware Set 12

Interior – WD Single Door –Rim Exit Device – Electronic Access

Each Door to Receive:

3	ea	Hinges	T4A3786 4 ½ x 4 ½	626	Mc Kinney
1	ea	Exit Device	ED5200 x N957	630	Corbin-Russwin
1	ea	Elec. Strike	310-4 24vdc NFS	630	Folger Adam
1	ea	Cylinder	3030.	626	Corbin-Russwin
1	ea	Door Closer	UNI-7500M x Reinf. Brackets	Alum	Norton
1	ea	Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1	ea	Power Supply	MPS10	USP	Folger Adam
1	ea	Push Button	15-2 MO SPDT (mount in office)	626	Folger Adam
1	set	Seals	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 13

Interior WD/HM UL Single Door Rim - Ingress/Egress

Each Door to Receive:

3	ea	Hinges	T4A3786 4 ½ x 4 ½ NRP	626	Mc Kinney
1	ea	Exit Device	ED5200SA x PR955	630	Corbin-Russwin
1	ea	Cylinder	3030.RHR Dr.	626	Corbin-Russwin
1	ea	Door Closer	PR7500M x SNB	Alum	Norton
1	ea	Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1	ea	Stop	1270CVSV	630	Trimco
1	set	Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 14

Interior WD UL Single Door Rim - Ingress/Egress – Mag Hold

Each Door to Receive:

3	ea	Hinges	T4A3786 4 ½ x 4 ½ NRP	626	Mc Kinney
1	ea	Exit Device	ED5200SA x PR955 x M54	630	Corbin-Russwin
1	ea	Cylinder	3030.RHR Dr.	626	Corbin-Russwin
1	ea	Door Closer	PR7500M x SNB	Alum	Norton
1	ea	Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1	ea	Stop	1270CVSV	630	Trimco
1	ea	Mag Hold	998	628	Rixson
1	set	Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 15

Roof Access HM UL Single Door Rim – Ingress/Egress Best Door

Each Door to Receive:

3 ea Hinges	T4A3386 4 ½ x 4 ½ NRP	630	Mc Kinney
1 ea Lockset	CL3357NZZ M08	630	Corbin-Russwin
1 ea Door Closer	PR7500M	Alum	Norton
1 ea Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1 ea Threshold	2005AN	Alum	Pemko
1 ea Sweeps	315DN	Neoprene	Pemko
1 set Weatherstrip	303DS Head and Jambs	Silicone	Pemko
1 ea Rain Drip	346D full width of frame	Alum	Pemko

Hardware Set 16

Interior WD/HM UL Single Door – Storeroom Lock

Each Door to Receive:

3 ea Hinges	T4A3786 4 ½ x 4 ½ NRP	626	Mc Kinney
1 ea Storeroom Lock	CL3357 PZZ PS	626	Corbin-Russwin
1 ea Door Closer	PR7500M x SNB	Alum	Norton
1 ea Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1 ea Stop	1270CVSV	630	Trimco
1 set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 17

Interior HM UL Single Door – Lock – Best Door

Each Door to Receive:

3 ea Hinges	T4A3786 4 ½ x 4 ½ NRP	626	Mc Kinney
1 ea Storeroom Lock	CL3357 PZZ M08	626	Corbin-Russwin
1 ea Door Closer	PR7500M x Reinf. Brackets x SNB	Alum	Norton
1 ea Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1 ea Stop	1270CVSV	630	Trimco
1 set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 18

Interior WD/HM UL Single Door – Lock

Each Door to Receive:

3 ea Hinges	T4A3786 4 ½ x 4 ½ NRP	626	Mc Kinney
1 ea Office Lock	CL3351 PZZ x PS	626	Corbin-Russwin
1 ea Door Closer	PR7500M x Reinf. Brackets x SNB	Alum	Norton
1 ea Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1 ea Stop	1270CVSV	630	Trimco
1 set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 19

Interior WD UL Pair Doors – Lock - Outswing

Each Pair to Receive:

6 ea Hinges	T4A3786 4 ½ x 4 ½ NRP	626	Mc Kinney
2 ea Flush Bolts	3915 12" LHR Dr.	626	Trimco

1 ea DP Strike	3910 LHR Dr.	626	Trimco
1 ea Storeroom Lock	CL3357 PZD PS RHR Dr.	626	Corbin-Russwin
1 ea Lock Protector	1082-6	630	Trimco
2 ea Closers	PR7500M x Rein. Brackets x SNB	Alum	Norton
2 ea Kick Plates	8" x 1" LDW .050 Push Side Mount	630	Trimco
2 ea Stops	1270CVSV	630	Trimco
1 set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 20

Interior HM Rolling Doors

Each Door to Receive:

1 ea Cylinder	1030 / 3030. PS as required	626	Corbin-Russwin
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Hardware Set 21

Interior WD Single Door Lock Outswing – Intruder Function

Each Door to Receive:

3 ea Hinges	T4A3786 4 ½ x 4 ½ NRP	626	Mc Kinney
1 ea Classroom Lock	CL3352 PZD PS	626	Corbin-Russwin
1 ea Closer	PR7500M	Alum	Norton
1 ea Stop	1270CVSV	630	Trimco

Hardware Set 22

Interior WD Single Door Lock Inswing – Intruder Function

Each Door to Receive:

3 ea Hinges	T4A3786 4 ½ x 4 ½ NRP	626	Mc Kinney
1 ea Classroom Lock	CL3352 PZD PS	626	Corbin-Russwin
1 ea Closer	7500M	Alum	Norton
1 ea Stop	1270CVSV	630	Trimco

Hardware Set 23

Interior WD Single Door Lock

Each Door to Receive:

3 ea Hinges	T4A3786 4 ½ x 4 ½	626	Mc Kinney
1 ea Office Lock	CL3351 PZD PS	626	Corbin-Russwin
1 ea Closer	PR7500M	Alum	Norton
1 ea Stop	1270CVSV	630	Trimco
1 set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 24

Interior WD Single Door Lock – Best Door

Each Door to Receive:

3 ea Hinges	T4A3786 4 ½ x 4 ½ NRP	626	Mc Kinney
1 ea Office Lock	CL3351 PZD M08	626	Corbin-Russwin
1 ea Closer	PR7500M	Alum	Norton
1 ea Stop	1270CVSV	630	Trimco
1 set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 25

Interior WD Single Door – Privacy

Each Door to Receive:

3	ea Hinges	T4A3786 4 ½ x 4 ½	626	Mc Kinney
1	ea Privacy Lock	CL3320 PZD	626	Corbin-Russwin
1	ea Closer	7500M	Alum	Norton
1	ea Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1	ea Mop Plate	4" x 1" LDW x .050 Pull Side Mount	630	Trimco
1	ea Stop	1270CVSV	630	Trimco
1	set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 26

Interior WD Single Door – Push/Pull

Each Door to Receive:

3	ea Hinges	T4A3786 4 ½ x 4 ½	626	Mc Kinney
1	ea Push Plate	57 8" x 16"	630	Trimco
1	ea Pull Plate	54x26B 4" x 16" 10" ctc 1" dia	630	Trimco
1	ea Closer	7500M	Alum	Norton
1	ea Dead Lock	DL3117 PS	626	Corbin-Russwin
1	ea Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1	ea Mop Plate	4" x 1" LDW x .050 Pull Side Mount	630	Trimco
1	ea Stop	1270CVSV	630	Trimco
1	set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 27

Interior WD UL Single Door – Privacy

Each Door to Receive:

3	ea Hinges	T4A3786 4 ½ x 4 ½	626	Mc Kinney
1	ea Privacy Lock	1097TL	626	Corbin-Russwin
1	ea Cylinder	1030.RHR Dr.	626	Corbin-Russwin
1	ea Closer	7500M	Alum	Norton
1	ea Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1	ea Mop Plate	4" x 1" LDW x .050 Pull Side Mount	630	Trimco
1	ea Stop	1270CVSV	630	Trimco
1	set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 28

Interior WD UL Single Door – Privacy

Each Door to Receive:

3	ea Hinges	T4A3786 4 ½ x 4 ½	626	Mc Kinney
1	ea Classroom Lock	ML2055 PSV PS	630	Corbin-Russwin
1	ea Cylinder	1030.RHR Dr.	626	Corbin-Russwin
1	ea Closer	7500M	Alum	Norton
1	ea Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1	ea Mop Plate	4" x 1" LDW x .050 Pull Side Mount	630	Trimco

1 ea Stop	1270CVSV	630	Trimco
1 set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 29

Interior WD UL Single Door – Computer Room

Each Door to Receive:

3 ea Hinges	T4A3786 4 ½ x 4 ½	626	Mc Kinney
1 ea Classroom Lock	ML2055 PSV PS	630	Corbin-Russwin
1 ea Cylinder	1030.RHR Dr.	626	Corbin-Russwin
1 ea Closer	7500M	Alum	Norton
1 ea Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1 ea Stop	1270CVSV	630	Trimco
1 set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 30

Interior WD Single Door – Passage

Each Door to Receive:

3 ea Hinges	T4A3786 4 ½ x 4 ½	626	Mc Kinney
1 ea Passage Lock	CL3310 PZD	626	Corbin-Russwin
1 ea Closer	7500M	Alum	Norton
1 ea Kick Plate	8" x 2" LDW x .050 Push Side Mount	630	Trimco
1 set Seal	PK33BL full Perimeter	Silicon	Pemko

Hardware Set 31

Misc. Hardware

Furnish to Owner:

1 ea Key Cabinet	Provide Wall Cabinet - Project plus 50% Expansion with cross reference filing system
1 ea Bitting List	Provide Original Keying Bitting List (with expansion) to owner's rep
50 ea Key Blanks	Provide to owners Rep

EXTERIOR WALL LOUVERS (Division 10)**Technical Standards**

- Specify exterior louvers and vents shall be fabricated in aluminum.
- Give preference to products manufactured within 500 miles of project.
- Give preference to products with post consumer and post industrial recycled content.
- Provide a statement of VOC content for adhesives and sealants.

Preferred Products

Manufacturers: The Airlite Co.
 Airstream Products Division of
 Penn Ventilator Co.

Fiberglass (FRP) Doors (Division 8)

Design Criteria

- Design **Fiberglass Reinforced Polyester (FRP) flush doors with aluminum frames** at all Exterior Doors, non-fire Rated Stairway Doors and Main Entrance doors where there is Heavy Traffic Usage and a need for High tolerance to abuse. Industrial grade Storefront Aluminum Doors and Frames may be used at main entrances in lieu of FRP flush doors if the designer so chooses. (Refer to Aluminum Storefronts)

Technical Standards

- Specify **1-3/4" extra heavy duty fiberglass wide stile FRP doors**. doors with aluminum alloy stiles and rails. Doors have an aluminum main frame constructed from extruded aluminum **6063 -T6 alloy**. Main frame tube is to be a single extruded unit measuring 1 1/2" x 5 1/2" (O.D.) on both side stiles, and 6" (O.D.) Top and Bottom rails. Spliced extrusions that are joined together to measure 6" will not be accepted.
- Specify all **Rails and Stiles** to have a minimum of 1/8" thick face walls and a 3/16" hinge edge wall.
- Specify the assembly for the meeting joints of the Rails and Stiles on the main frame are to be **MORTISE & TENON** on all four joints. Secured with: 2 Tie Rods in Head Rail, 1 Tie Rod in Bottom Rail, welded joints will not be accepted.
- Specify **face sheets** that will be fiberglass reinforced polyester, .120" thick, and have a pebble-like embossed finish. FRP face sheets are MR85 high impact frp material that has been tested by ASTM D5420 Gardner Impact Test with "Mean Failure Energy" rating no lower than 411.84 in-lb. (or equal). Both faces of the door must have a 26 Ga. liner bonded to the face sheet and core.
- Specify a **core material** with a 25 psi density polystyrene with a flame spread rating of no more than 25.
- Specify an **inter-loc edge trim** - All aluminum trim is completely removable. All parts of the door are replaceable and repairable in the field. No fastening devices are exposed on the Stile Edge Trims. Snap-on or screw-on stile trim will not be accepted.
- Specify **weatherstrip** that is integral with the doors and frames.
- Specify **closer reinforcing** to be 3/16" steel inserted into the head rail. Other surface applied hardware is reinforced with the standard mainframe tube wall thickness of 1/8". Reinforcing for mortise and concealed hardware is to be done per template requirements. Sex or thru bolts will not be accepted.
- Specify **standard closed back frames** of extruded aluminum 6063-T5 alloy and a wall thickness of .125". All vertical frame jambs and mullions will be full height of opening. Tube sections will be 2" x 8" with joints connected by use of reinforcing clips and machine screws. All exposed screws must be stainless steel with spanner heads.

- Specify **fiberglass (FRP) panels** and **aluminum edged fiberglass (FRP) panels** constructed of two sheets of .120 fiberglass sheets bonded to 3/4" core material. Panel thickness will be 1". An aluminum frame surrounds the perimeter of the panel, and measures 1" x 1" x 1" with 1/8" wall thickness. Wood edged panels will not be accepted.
- Specify **vision lite trim moldings** to be aluminum extrusion - 6063-T5 alloy and removable from the inside only. All exposed screws must be stainless steel with spanner heads.
- Specify **all lights shall be glazed** with wire glass **pattern that is square**, not diagonal, and as REQUIRED by code, impact resistance glass shall be furnished and installed where safety type glass is REQUIRED in lieu of wire glass.
- Specify **recessed pull handle**, 6" x 8 1/2" x 1-9-16", manufactured from all extruded aluminum 6063-T6 alloy. Unit is welded together. Pull will be finished to match door edge trim or as specified. All exposed screws must be stainless steel with spanner heads products. Pull is to be supplied and installed at factory by door manufacturer.
- Specify a Wide Stile FRP door and frame system that will carry a **25 year limited warranty** on doors structural integrity, main frame, and the lamination between face sheets and core. the entire system (excluding hardware) will be guaranteed for 10 years.
- Specify **FRP Entrance systems** that comply with requirements for system performance characteristics as determined by the testing methods that follow. Complete system units that include door, frame and hardware are to meet the following criteria:
 - R-value expressed in hr-ft (2)-F/Btu - ASTM 1503-98 - 1.43
 - Air Infiltration:**
 - ASTM E283 @ 1.56 psf (25 mph) - 0.31 cfm/ft (2)
 - ASTM E283 @ 6.24 psf (50 mph) - 0.97 cfm/ft (2)
 - Water Penetration:**
 - ASTM E331 - 15 Min Cycle - NO ENTRY
 - Uniform Load - ASTM E330 - (+) - 82.5 psf
 - Exit Bar Pull Off Test** - 2400 lbs. minimum load resistance before exit bar disengages from door.
 - Door Closer Pull Off** - 1638 lbs. minimum load resistance before closer disengages from door.
 - WINDBORNE DEBRIS RESISTANCE TESTS:**
 - Missile Impact Test:** - PA 201 - 94 - PASSED
 - Cyclic Wind Pressure Test - PA 203 - 94 - 60PSF
 - Forced Entry Test - SFBC 3603.2 - 300 lbs. - PASSED

Preferred Products

COMMERCIAL DOOR SYSTEMS (CDS)-F500HD

EXTRUDART-“V”- **EXTRUDART**, Model “V” HD, modified as follows

Aluminum or Steel Urethane CORE LINER for urethane core material that has a FLAME SPREAD higher than 25. Tie rods installed in top and bottom of main frame rails. 6" bottom rail aluminum tube. 3/16" Steel closer reinforcing inserted into head rail tube. MR85 RP face sheets, 26 Ga. liner bonded between the face sheets and core material. Provide extended 25 year warranty for this project. **UPDATED TEST INSOLRAE**, Model FL-II, modified as follows:

Polystyrene core, Steel Closer Reinforcement, 2nd tie rod in head, MR85 “FRP” face sheets, 26 Ga. liner bonded between the face sheets and core material.

GLAZING (Division 8)**Design Criteria**

- Design dual glazing top and bottom at stairs and corridors and other windows less than 6 feet high.
- Design 1" insulating panel at top and dual glazing at bottom, at windows other than at stairs and corridors that are over 6 feet high.
- Design adequate natural ventilation for existing glazing that is blocked off by interior alterations.
- Wired Glass shall not be installed where Impact Resistant Glass is required by Code.
- Impact Resistance Glass shall meet the requirements of IBC 2003 Revision and pass the test requirements of CPSC 16CFR 1201, Chapter 35.

Technical Standards

- Specify 1" dual glazing 1/4" tempered glass (interior & exterior) insulating units.
- Specify outdoor lite to be coated on interior face.
- Schedule and specify tempered glass at locations identified by Building Code, as hazardous.
- Specify wired glass pattern to be 1/2" square, not diamond or hexagon.
- Schedule and specify obscure glass at all windows in toilet rooms, locker rooms, basements and other rooms where visual privacy is desirable.
- Specify Visible Light Transmittance of 64% minimum.
- Specify Ultraviolet Transmittance of 5% maximum.
- Specify winter nighttime U-Factor of 0.28 maximum.

- Specify summer daytime U-Factor of 0.26 maximum.
- Specify Shading Coefficient of 0.32 maximum.
- Specify Heat Gain Coefficient of 0.27 maximum.
- Give preference to products manufactured within 500 miles of project
- Provide statement of VOC content for sealants
- Provide LEED credit documentation indicating location of product manufacturing, extraction, and processing of materials, including costs for products.

Preferred Products

Wired Glass:	Pilkingon Polished Wire Glass
Fire & Impact Rated Glass	Technical Glass Products
Insulating Glass	PPG Solarban 70XL

INSECT SCREENS (Division 10)**Design Criteria**

- Do not locate insect screens at HVAC air intake openings.
- Indicate bird screens only near HVAC air intake openings.

Technical Standards

- Specify wire fabric insect screen inserts at operating window units in the following locations:
 - Cafeterias and Food Preparation Areas
 - Lounges
 - Medical Rooms
- Do not specify aluminum wire fabric insect screens.
- Give preference to products manufactured within 500 miles of project
- Give preference to products with post consumer and post industrial recycled content

Preferred Products

(None)

JOINT SEALANTS (Division 7)

Technical Standards

- Specify high quality, long lasting, paintable sealant materials. Consult with manufacturers and sub-contractors about materials appropriate to all specific uses.
- Schedule all sealants and key to drawings.
- Provide backer rods at all locations.
- Give preference to products manufactured within 500 miles of project
- Give preference to water based products
- Limit VOC content of sealants to less than current limits of the South Coast Air Quality Management District Rule #1168 and Bay Area Air Quality Management District Regulation 8, rule 51
- Meet Calif. Dept. of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small Scale Environmental chambers, including 2004 Addenda.
- Elastometric joint sealers are to be in compliance with ASTM C920 for classification and class.
- Acrylic-latex or siliconized acrylic-latex sealants in compliance with ASTM C834.
- Sealant backings are to be in compliance with ASTM C1330.

Preferred Products

GE Silicones
Pecora Corporation
Tremco
Polymeric Systems, Inc.
Dow Corning

04210 - Masonry Units

Comments

Except where matching existing brick, brick shall be utility brick (nominal 12" x 4" x 4") laid in thirds.

The use of jumbo or oversized brick may permit the reduction of on site masonry costs, as will limiting the use of piers, pilasters, elaborate patterning, and other labor intensive features.

When using oversized brick, remember that a higher cost per 1000 brick allowance must be utilized in the contract.

Consider multiple floor spans for masonry walls to minimize the number of shelf angles used. The School District has found that this type of arrangement is most suitable when the exterior wall is designed so that masonry is carried directly by footings and beams.

Design and detailing of brick masonry should follow the recommendations of the Brick Institute of America, (BIA). They are the ultimate authority on this subject. See their publication titled, *Tech Notes*.

Long term maintenance experience has indicated that partitions adjacent to high traffic use, such as corridors and stair wells, are most economically designed with Concrete Masonry Units. Similarly, economies of scale can be realized by utilizing CMU extensively. Design and detailing of CMU should follow the recommendations of the National Concrete Masonry Association, (NCMA). They are the ultimate authorities on this subject.

Acoustical masonry has been found to be relatively effective in spaces where floor and ceiling finishes are necessarily hard surfaced for housekeeping reasons. In such cases, walls afford the only opportunity for acoustical control. (Also see Section **9700** Wall Finishes and Section **9500** Ceilings)

Design of masonry shall be engineered. Empirical design is not acceptable.

Provide control joints in all masonry wythes spaced not to exceed:

- 12'-0" for concrete masonry less than 4-inch nominal thickness.
- 24'-0" for all brick & concrete masonry greater than 4-inch nominal thickness

| Give preference to products manufactured within 500 miles of project.

PORTLAND CEMENT PLASTER (STUCCO) (Division 9)

- Detail exterior stucco as a minimum of 3/4" Portland Cement Plaster applied to galvanized metal lath attached framing or structural elements.
- Specify that color of stucco shall be achieved through color selection of sand and aggregates.
- Give preference to products manufactured within 500 miles of project

NOTE: EIFS is not approved for use on SDOP Projects.

Preferred Products

(None)

Steel Doors and Frames (Division 8)**Design Criteria**

- Do not provide replacement of narrow-profile steel and wired glass doors, sidelights and transoms at stairwells. Indicate specific repair work at each such location, including:
 - Mechanical adjustment of door swings.
 - New door closers
 - New continuous hinges (McKinney)
 - Replacement of all broken or non-matching glazing with wired glass.
 - Scraping and painting of all doors and framing.
- Design and schedule hollow metal doors and frames at the following locations:
 - Exterior Doors Sheltered from Rain
 - Stairway Doors
 - Mechanical Equipment Room Doors
- Design frames with sub-frames 1/8" bent plate hot-dip galvanized, G-140, steel sub-frames for all fire-rated and non-fire-rated door frames, to replace existing frames, unless noted otherwise.
- Design welded masonry frame where new masonry walls are constructed.
- Design welded dry wall frame where new drywall partitions are constructed.
- Design and detail wire guards at vision lights in interior and exterior doors to be mounted on vision light frame to provide space between wire guard and glass.
- Design vision lights in cross corridor doors to be 3" X 33" with bottom of opening located at 42" above finished floor.
- Design vision lights, in all doors scheduled to have vision lights, with Metal frames and wired glass. Specify wire pattern to be 1/2" square and not diamond or hexagonal. Do not provide wired glass where impact resistance glass is required by code.

- Do not Design side lights in partitions rated 1 hour or greater, unless at stairwells.
- Design side lights at door/panel assemblies at stairwells with fire rated glass (FireLite NT where required).
- Design side lights to a single standard size, to as great an extent as possible.

Technical Standards

- Specify 1 ¾ inch thick Steel Stiffened Doors with sheets made of commercial quality, 16 gage hot dipped zinc coated steel that complies with ASTM A924 A60.
- Specify door Vertical edges that join the face sheets by a continuous weld extending the full height of the door. Welds are to be ground, filled and dress smooth to make them invisible and Design a smooth flush surface.
- Specify hinge reinforcement to be not less than 7 gage (3/16") plate 1-1/4" X 9".
- Specify reinforced tops and bottoms of all doors with a continuous steel channel not less than 16 gage, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel shall have a steel closure channel welded in place so the web of the channel is flush with the top of the face sheets of the door. Plastic fillers are not acceptable.
- Specify exterior doors to have 14 gage vertical steel stiffeners spanning the full thickness of the interior space between door faces. Stiffeners are spaced not more than 6" apart, and attached by spot welds spaced not more than 5" on centers. Spaces between stiffeners are to be filled with fiberglass insulation (min. density 0.8#/cubic ft.)
- Specify Door Louvers and Vision Lights Design louvers (Anemostat FLDL-UL-SGZ) according to SDI 111 C for interior doors where indicated, with blades or baffles formed of 0.0236-inch-thick cold-rolled steel set into minimum 0.0359-inch-thick steel frame. Frame Material: 0.0516 inch-thick cold-rolled steel, hot-dip galvanized, G-90. Grille Material: 1" centers, on both sides of glazing material.

Louvers not permitted as per HVAC Design Approach 9.K

- Specify mounting holes for lights and louvers with 1/4" diameter

holes around perimeter of opening. Mount frame with #8X32 Phillips head steel thru bolts, with blank head on exterior side.

- Specify Steel Frames for lights and louvers to be 14 gage, hot dipped zinc coated steel that complies with ASTM designations A924 A60
- Specify all frames for lights and louvers shall be designed with die cut miters and face welded seams. All frames are to be assembled so that the face miter joint and top miter return angle is closed, flush and ground smooth. Weld and dress the face seam of the frame and the top corner smooth. Grind and dress the weld area smooth. Apply a zinc rich primer over the grinding area, and finish with a matching prime paint.

Louvers not permitted as per HVAC Design Approach 9.K

- Specify frames with sub-frames 1/8" bent plate hot-dip galvanized, G-140, steel sub-frames, to replace existing frames, at all fire-rated and non-fire-rated door frames, unless noted otherwise.
- Specify hardware reinforcements to be in accordance with the minimum standard gages as listed in SDI-100. Specify Hinge reinforcements to be 7-gage steel.
- Specify frames to be mortised, reinforced, drilled and tapped at the factory for template mortised hardware only, in accordance with approved hardware schedule and template Designed by the hardware contractor. Where surface mounted hardware is to be applied, frames shall have reinforcing plates only; others shall do all drilling and tapping.
- Specify the certification by manufacturer and approval by SDoP of galvanic coating before prime coat of paint.
- Specify doors and frames to comply with current issue of National Fire Protection Association (NFPA) Standard Number 80.
- Give preference to products manufactured within 500 miles of project
- Give preference to products with post consumer and post industrial recycled content
- Statement of VOC content for adhesives and sealants

Preferred Products

Door and Frame Manufacturers:

Curries Company
Ceco Door Products
Steelcraft Manufacturing

Vision Lite and Louver Manufacturers

Louvers not permitted as per HVAC Design Approach 9.K

Anemostat
LL Building Products
Air Louver

VAPOR RETARDERS (Division 7)**Design Criteria**

- Detail and specify a pliable vapor barrier beneath all slabs on grade.
- Provide Statement of VOC content for adhesives, sealants, and binders.

Preferred Products

(None)

WOOD DOORS (Division 8)**Design Criteria**

- Design all wood doors to be Pre-fitted, Pre-machined and Pre-finished. All standard and fire rated type wood doors shall have flush faces (except where lites or louvers are indicated, and Dutch-type doors shall require written authorization by the Architect. All single leaves shall be 3'0" x 7'0" x 1 3/4" and all leaves within a paired opening shall be the 2 each 3'0" x 7'0" x 1 3/4" (6'0" opening). Dutch doors required in some rooms as per Room Standards.
- Design new and existing wood doors to match (wherever possible) in color and texture. Hardwood veneer finish is to be furnished for wood doors in public areas, and wood suitable for paint finish, elsewhere. All non-labeled wood doors shall be furnished with a solid core of high-density particleboard with wood face veneer.
- Design all louvers to be inverted "Y" type. All louvers and light kits shall be metal and all shall be fully painted. Cut outs to be sealed. At all existing operating transom lights, these shall be fixed shut or as otherwise specified.

Louvers not permitted as per HVAC Design Approach 9.K**Technical Standards**

- Specify Door Construction: Non-Fire Rated Doors: Thickness: 1-3/4 inches, interior flush wood, bonded, solid core conforming to WDMA I.S. 1-A 2004 and the following; Core: bonded particle core (PC) conforming to WDMA I.S. 1-A 2004. Door construction shall conform to WDMA I.S. 1-A 2004 Premium Grade requirements.
- Specify Stiles: Hardwood to match face veneer over structural composite lumber (SCL), glued to core. Rails: Mill option hardwood or SCL. Top and bottom: 2 inches, and Facing shall be Wood veneer as specified.
- Specify Fire Rated Doors: Thickness: 1-3/4 inches, interior flush wood, bonded, solid core conforming to WDMA I.S. 1-A 1997 and the following; Core: bonded mineral core (FD) conforming to WDMA I.S. 1-A 1997. Door construction shall conform to WDMA I.S. 1-A 1997 Premium Grade requirements.

- Specify Stiles of Hardwood to match face veneer over mineral composite, glued to core. Rails: Mineral composite as required by fire door authorities. Top and bottom: as required by manufacturer's fire door authorities. Facing: Wood veneer as specified.
- Specify Wood Veneer Door face veneers to meet HPVA "A" grade quality standards conforming to WDMA I.S. 1-A for transparent or semi-transparent finish. Minimum face veneer thickness shall be 1/50" at 12% moisture content after finish sanding.
- Specify face to core adhesives to be Type I or Type II as appropriate for location in building. Adhesives must be classified Type I or Type II per WDMA TM-6 "Adhesive Bond Test Method." Type I adhesives shall be used for doors in exterior applications; Type II adhesives shall be used for doors in interior applications.
- Consider eliminating resins containing added urea-formaldehyde and limiting VOC content of adhesives and sealants
- Specify Transparent Finish: Match finish indicated in WDMA Section G-17: WDMA System #6.
- Limit VOC emissions from paint and coatings as referenced in Green Seal Standards GS 11
- Specify wood doors in accordance with requirements of WDMA I.S. 1-A-2004_Quality Standards. Fabricate fire rated doors in accordance with requirements of ITS – Warnock Hersey or Underwriters' Laboratories, with metal label on each door including UL-10C. Wood door blocking for reinforcement (and enhanced screw attachment) shall be furnished on all doors. Sex nuts and bolts shall not be allowable in lieu of wood blocking and no hardware shall be installed with the use of sex nuts or grommet nuts.
- Specify doors with WDMA Quality Standards hardware blocking options_as follows:
 - Provide HB-1 – head and HB-2 – sill rails and HB-4 – lock-block on all doors.
- Provide HB-6 only when exit devices are specified for door. Provide HB-8 for pivots or when floor bolts are specified under Section 08710 – Finish Hardware.

- Provide doors with minimum ¼ inch thick edge strips, of wood species to match face veneers except as required for fire rating.
- Specify manufacturer's guarantee for all wood doors. Guarantee period: Lifetime of original installation. Doors exhibiting defects in materials or workmanship including warp and delamination within guarantee period shall be replaced (including hanging and finishing) with new doors. These terms shall be part of the manufacturer's standard warranty.
- Fire-Rated Wood Doors: Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies in accordance NFPA 252 and which are labeled and listed for ratings indicated by ITS – Warnock Hersey, UL or other testing and inspection agency acceptable to authorities having jurisdiction. Doors: shall comply with UBC 7-2 1997 where required, and provided (where required) to be equipped with intumescent requirements in compliance with UL-10C.
- Specify doors to receive hardware. Refer to Section 08710 - Hardware and NFPA 80 for hardware requirements including UL-10C.
- Fire Rated Pair of Doors; greater than 20 minute: Supply overlapping astragals or metal edge sets only as required by NFPA 80 1999 or by door manufacturer's fire door authorities. If an astragal is required, to comply with fire rated labeling requirements for pairs of fire rated doors, provide door manufacturer's standard tested astragal.
- Specify that existing operating transom lights shall be fixed shut or otherwise eliminated.
- Specify louvers in doors to be metal, inverted "Y" type, full depth of door.

Louvers not permitted as per HVAC Design Approach 9.K

- Specify that tops and bottoms of doors are to be sealed.
- Give preference to products manufactured within 500 miles of project
- Give preference to products that use certified wood for veneers

Acceptable Manufacturers

- Equal products by manufacturers not listed here will be considered only if those products are in strict compliance with the demands of the performance specification. The manufacturer's name, address, phone number and any modifications needed to a standard product must be noted on the request for approval. Specify submittal of manufacturer's technical data for each type of door, panel or miscellaneous accessory. Include door (or component part's) sections, elevations, and details. Specify submittal of two samples of each door type or series that shows rails, stiles, core, joint construction, and edge trim.

PREFERRED PRODUCTS

Graham
Marshfield
Eggers

Vision Lights (Division 8)

- Specify metal door louvers and light kits. Seal cutouts prior to installation of moldings.
Louvers not permitted as per HVAC Design Approach 9.K
- Specify all vision frames to be metal. At all rated doors specify manufacturer's tested metal clip or comparable metal light kit system. At fire-rated doors specify ITS – Warnock Hersey or UL approved glazing system. Glass: Refer to Section 08810 for glass types.
- Specify all lights to be glazed with wire glass pattern that is square, not diagonal, and as REQUIRED by code. Impact resistance glass shall be furnished and installed where safety type glass is REQUIRED by code in lieu of wire glass.
- Specify Vision Lite Frame finish to be as manufacturer's standard beige color.

PREFERRED PRODUCTS

L & L Building Products
Anemostat
Wood Door Manufacturer

FSC certification
No urea formaldehyde in binders or adhesives

ROOF COVERINGS (Division 7)**Design Criteria**

- Design sloped roofs wherever possible.
- Design sloped, standing seam metal roofs as first preferred choice for new construction.
- Design sloped roof with Thermafiber shingles as second preferred choice for new construction.
- Consider providing a sloped standing seam metal roof and framing system over an existing flat roof, in lieu of re-roofing.
- Design single-ply modified bitumen roofs as first preferred choice and for re-roofing projects.
- Design multiple-ply bituminous built-up roofs as second preferred choice and for re-roofing projects.
- Include painting of all metal brackets, frames, ladders, and similar metal items as part of re-roofing projects.

Technical Standards

- Specify 4-ply built-up bituminous system where budget or other limitations preclude use of a superior roofing system.
- Specify modified bituminous sheet system where budget or other limitations preclude use of a superior roofing system and where slopes exceeding limitations for built-up.
- Design all bituminous roofs using vented base sheets.
- Specify and indicate tapered insulation to achieve as much pitch as possible in re-roofing projects. Consider visibility and appearance with regard to heights of parapet walls.
- Provide LEED credit documentation indicating location of product manufacturing, extraction, and processing of materials, including costs for products.

- Provide LEED credit documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.
- Provide LEED credit documentation indicating Solar Reflectance Index (SRI) for the Energy Star Solar Reflective Coating.

Energy and Environmental Design Requirements

Design Criteria

- To lower roofing temperature extremes, reduce thermal cycling, and reduce cooling demand, design and specify roofing surfaces reflect heat. This also reduces the Urban Heat Island effect. Meet requirements of Sustainable Sites Credit SS Credit 7.2: Heat Island Effect: Roof.

Preferred Products: (None)

LEED Details

- LEED for Schools (November 2007) Sustainable Sites Credit SS Credit 7.2 requires the roofing to be reflect heat or to be a vegetated green roof. The design must comply with one of the following options:

OPTION 1

1. Use roofing materials having a Solar Reflectance Index (SRI)¹ equal to or greater than the values in the table below for a minimum of 75% of the roof surface.

Roof Type	Slope	SRI
Low-Sloped Roof	≤ 2:12	78
Steep-Sloped Roof	> 2:12	29

OR

OPTION 2

¹ The Solar Reflectance Index (SRI) is a measure of the constructed surface's ability to reflect solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is 0 and a standard white (reflectance 0.80, emittance 0.90) is 100. To calculate the SRI for a given material, obtain the reflectance value and emittance value for the material. SRI is calculated according to ASTM E 1980. Reflectance is measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance is measured according to ASTM E 408 or ASTM C 1371.

1. Install a vegetated roof for at least 50% of the roof area.

OR

OPTION 3

Install high albedo *and* vegetated roof surfaces that, *in combination*, meet the following criteria:

$(\text{Area of SRI Roof} / 0.75) + (\text{Area of vegetated roof} / 0.5) \geq \text{Total Roof Area}$

Potential Technologies & Strategies

Refer to the Cool Roofing Council Rated Products Directory at:

<http://www.coolroofs.org/products/search.php>

Integration Opportunities

A vegetated green roof can offset to Stormwater management costs. Consider cost savings opportunities for reduced cost of real estate, installation site work, and long term maintenance for Stormwater BMPs that could be avoided.

MANUFACTURED ROOF SPECIALTIES (Division 7)**Design Criteria**

- Do not design stairways to go to roof unless SDOP program requires it.
- Design roof access by way of hatch and ladder located in a secured space.
- Design metal stairs, where possible, otherwise ladders shall provide access to all roof levels.
- Design roof security barriers, if required, as part of a re-roofing project.

Technical Standards

- Specify prefabricated curbs and cants in lieu of custom fabricated.
- Specify an interior locking device on roof hatches.
- Provide Statement of VOC content for sealants.

Preferred Products**Curbs:**

Curbs Plus, Inc.
Custom Curb, Inc.
Pate Co.
ThyCurb, Inc.
Uni-Curb, Inc.

Roof Hatches:

Babcock-Davis Hatchways, Inc.
Bilco Co.
Dur-Red Products, Inc.
Milcor, Inc.
Wasco Products, Inc.

MEMBRANE ROOFING (Division 7)**Design Criteria**

- Include painting of all metal brackets, frames, ladders, and similar metal items as part of re-roofing work.

Technical Standards

- Specify 4-ply built-up bituminous system where budget or other limitations preclude use of a superior roofing system.
- Specify modified bituminous sheet for slopes exceeding limitations for built-up systems.
- Design all bituminous roofs using vented base sheets.
- Provide Statement of VOC content for sealants and adhesives.
- Provide LEED credit documentation indicating location of product manufacturing, extraction, and processing of materials, including costs for products.
- Provide LEED credit documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.
- Provide LEED credit documentation indicating Solar Reflectance Index (SRI) for the Energy Star Solar Reflective Coating.

Preferred Products

(None)

Membrane Roofing

Comments

Since roofs have always been and probably always will be primary sources of building water leaks, the very best and highest quality of roofing should be considered on every project. Metal roof systems will probably outlast any other type. However, when their cost exceeds the budgeted funds available, single-ply systems are acceptable, if the appropriate one is selected according to the individual case.

Single-ply neoprene rubber systems will not be considered. The SDP has experienced significant failures with these products owing to failure of the seams.

Single-ply modified bitumen systems are exceptionally good and are installed with traditional roofing application skills familiar to virtually the entire roofing construction industry. Caution must be used in detailing and specifying modified bitumen systems to assure that the manufacturer's specifications and recommended details are accurately followed.

MODIFIED BITUMINOUS MEMBRANE ROOFING (Division 7)**Technical Standards**

- Detail and specify modified bituminous membrane roofing as second choice, when selecting a new roof.
- Do not specify modified bituminous membrane roofing over wood deck.
- Provide Statement of VOC content for all sealants and adhesives.

Preferred Products

Modified Bituminous Membrane

Tamko Asphalt Products
GAF Building Materials
Corporation
Siplest, Inc.
Soprema, Inc
Schuler/Manville Roofing
Systems

| Energy and Environmental Design Requirements

- If a modified bituminous membrane roofing system is used it will require a reflective top sheet or an additional reflective top coating to meet the LEED Requirements for minimum Solar Reflectance Index. SEE B 30 Roofing – General Design Requirements (Division 7) for details.
- Provide LEED credit documentation indicating Solar Reflectance Index (SRI) for the Energy Star Solar Reflective Coating.
- Provide LEED credit documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.
- Provide LEED credit documentation indicating location of product manufacturing, extraction, and processing of materials, including costs for products.

ACOUSTIC DESIGN STANDARDS

- The acoustic environment has a critical impact on the ability to teach and learn. Because too many schools have unacceptable acoustic environments, there has been a movement to develop standards related to acoustic performance in schools.

- ANSI S12.60-2002 shall be used as the standard for design. In design of a proper educational environment it is important to understand and respond to conditions that influence speech intelligibility. These conditions also have an affect on human comfort. These conditions include the liveliness of the environment (reverberation), background noise, intensity of the acoustic signal and distance between the speaker and listeners. Changes to any of these conditions have an affect on the requirements for the other conditions.

- The English language involves a speech frequency range of approximately 200 to 6,000 Hz with most of this falling within 500 to 3,000 Hz. Normally vowels are long duration, higher energy and lower frequency sounds. The opposite is generally true for consonants as short duration, lower energy and higher frequency sounds. Consonants have a greater impact than vowels regarding the ability to understand speech. Under ideal conditions, direct processing of the signal will normally result in comprehension, but ideal conditions rarely exist. A certain amount of reverberation is normally necessary to carry speech throughout a room, but too much reverberation will cause sounds to become muddled and confused by superimposed signals. The optimum reverberation time for speech is below 1.0 seconds, while the optimum reverberation time for music is 2.0 seconds or higher.

- In designing the acoustic environment for schools, each type of space will require evaluation based on differing requirements. That which is perceived as ideal conditions for listening to speech is usually considered too dead for music. Private conversations require different criteria than are required for group conversations.

- The design professional shall evaluate the acoustic environment for each habitable space during the design of facilities for the School District of Philadelphia. This analysis shall include evaluation of background noise (dBA or NC), the sound transmission rating (STC) for the envelope of each space, HVAC and other mechanical system noises, and impact noise. It shall also include evaluation of reverberation time at each of 500, 1,000, and 2,000 Hz.

- The following shall be considered as design guidelines. Because variations in background noise, reverberation time, intensity of noise sources and physical volume of each space can have an impact on the acoustic environment, proper analysis and design may result in differences to these guidelines.

Sound Transmission through Envelope of Space

Minimum STC ratings shall be required in accordance with the following ANSI S12.60-2002 Table:

Minimum STC ratings required for single or composite wall, floor-ceiling and roof-ceiling assemblies that separate a core learning space from an adjacent space

Adjacent space			
Other enclosed or open plan core learning space, speech clinic, health care room and outdoors ^{c)}	Common use and public use toilet room and bathing room	Corridor, ^{a)} staircase, office or conference room ^{a, b)}	Music room, mechanical equipment room, ^{d)} cafeteria, gymnasium, and indoor swimming pool
50	53	45	60

a) For corridor, office, or conference room walls containing doors, the basic wall, exclusive of the door, shall have an STC rating as shown in the appropriate column in this table. The entrance door shall conform to the requirements of 4.5.5.

b) When the need for acoustical privacy is critical, the minimum STC rating of the partitions around an office or conference room shall be increased to 50.

c) An STC rating of 50 is the minimum for the exterior walls and roofs of a core learning space. However, this rating does not ensure conformance to the background noise limits in table 1 for noise from major outdoor noise sources. See D2.3 in annex D for further guidance on the selection of appropriate STC ratings.

d) When the adjacent space is a mechanical equipment room containing fans circulating 140 m³/min(5000 ft³/min.) or more, the minimum STC rating shall be 60. When the fan circulation is less than this rate, the STC rating may be as low as 45 providing the maximum A-weighted steady background noise level in the adjacent core learning space does not exceed 35 dB. The minimum STC rating shall include the effect of entry door(s) into the mechanical equipment room.

- The design of partitions of each habitable space shall be based on the sound level of the noise that penetrates them. It also depends on masking that will be provided by background noises on both sides of the envelope. When considering masking noises, these masking noises shall not include intermittent sources that will not be constant during all times of expected occupancy. General guidelines are as follows:
 - Isolation of very loud sounds such as loud music and power tools. With NC of 25, minimum STC of 60, and with NC of 35, minimum STC of 55 (note that NC applies to space exterior to envelope of space where noise is generated). This level of noise would be expected to be generated in Auditoriums, Cafeteriums, Vocal and Instrumental Music Rooms, Building Receiving Areas, Gymnasiums, and places equipped with power tools. Dependant on type of equipment, noise of this level may generate in mechanical equipment spaces. Ideal condition for Auditoriums and Radio and Television Broadcast spaces would require lower NC levels and higher STC ratings.
 - Isolation of all conversations that require confidential security. With NC of 25, minimum STC of 50, and with NC of 35, minimum STC of 45 (note that NC applies to space exterior to envelope of space where noise is generated). Types of spaces requiring this isolation include administrative, guidance and nurse's office, conference rooms and teacher dining spaces. Also isolate mechanical spaces not included above.
 - Isolation of all but loud speech which would be only faintly heard. With NC of 25, STC of 45 to 50, and with NC of 35, STC of 40 to 45 (note that NC applies to space exterior to envelope of space where noise is generated). Types of spaces requiring this isolation include Instructional Spaces (classrooms and laboratories) and Instructional Media Centers.
 - Isolation of normal speech. With NC of 25, STC of 40 to 45, and with NC of 35, STC of 35 to 40 (note that NC applies to space exterior to envelope of space where noise is generated). Types of spaces requiring this isolation include general offices.
 - Minimal isolation of speech; will allow loud speech to be understood. With NC of 25, STC of 35 to 40, and with NC of 35, STC of 30 to 35 (note that NC applies

to space exterior to envelope of space where noise is generated). This is the minimal sound transmission that would be acceptable in the facility.

Impact Noise

- Impact noise needs to be considered when selecting materials of constructions. The materials need to be evaluated to minimize impact sounds in spaces adjacent to where the impact occurs. These include:
 - Impact from traffic and other activities (such as sliding of furniture) on floors above a habitable space.
 - Heavy rains or hail on roofs above habitable spaces.
 - Slamming of locker doors in corridors that would transmit to habitable spaces.
 - Aggressive writing on chalk boards attached to common wall of a habitable space.
 - Bouncing of balls on gymnasium floors or walls common to other habitable spaces.

Background Noise

- Maximum levels of background noise shall be in accordance with ANSI S12.60-2002 as follows:

Maximum A-weighted steady background noise levels and maximum reverberation times in unoccupied, furnished learning spaces

Learning space ^{a)}	Maximum one-hour-average A-weighted steady background noise level ^{b, c)} dB	Maximum reverberation time for sound pressure levels in octave bands with mid-band frequencies of 500, 1000 and 2000 Hz _s
Core learning space with enclosed volume < 283 m ³ (< 10 000 ft ³)	35	0.6

Core learning space with enclosed volume > 283 m ³ and ≤ 566 m ³ (> 10 000 ft ³ and ≤ 20 000 ft ³)	35	0.7
Core learning spaces with enclosed volumes > 566 m ³ (20 000 ft ³) and all ancillary learning spaces	40 ^{d)}	e)
<p>a) See 3.1.1.1 and 3.1.1.2 for definitions of core and ancillary learning spaces.</p> <p>b) See 4.3.1 for limits on unsteady (time varying) background noise levels.</p> <p>c) See 4.3.2 for other limits on background noise from building services and utilities including C-weighted steady background noise levels.</p> <p>d) When corridors are used solely for conveyance of occupants within the school building and structured learning activities do not occur, the A-weighted steady background noise level limit for such corridors may be increased to 45 dB. The use of corridors for formal learning purposes should be avoided.</p> <p>e) See C3.3 in annex C for recommendations on control of reverberation in these spaces.</p>		

- Along with sound transmission and impact noise, HVAC delivery noises combine to establish the background noise in each space. The ideal background noise would be within a range of NC 25 to NC 35 for instructional spaces. This range provides an acoustic environment that is considered quiet and allows for a normal conversation within a range of 30 feet. A lower NC would be very quiet without enough background sound to provide beneficial masking of noises from adjacent areas, and this would require increasing the STC of the space's envelope. Higher NC represents additional acoustic challenges.
- Generally the background criteria for different types of spaces in the school building are as follows:
 - NC 15-25: Auditoriums, broadcast studios.
 - NC 25-35: Classrooms, laboratories, music rooms, assembly spaces without amplification (cafeteria and non-spectator seating gymnasium), offices and instructional media centers.
 - NC 40-45: Heavy circulation areas and assembly areas with amplification (spectator seating gymnasiums).

- Meeting the above criteria is in conflict with the School District of Philadelphia preferred HVAC delivery system of unit ventilators. Other systems can also be a challenge. This will require close coordination between the designers of the Acoustics and HVAC Systems. There will also need to be coordination with other disciplines to achieve a properly designed acoustic environment.
- The following are guidelines related to HVAC design and acoustic performance:
 - Specify equipment, grilles and diffusers to meet noise criteria (NC) established by acoustic design requirements for each room.
 - Design airflow velocities in trunk ducts not to exceed 800 ft/min. with branch ductwork sizes matching the air device duct connection size.
 - Specify duct silencers inside the air handling unit or in the main supply and return ducts.
 - Design ductwork to achieve a low static pressure loss in accordance with *SMACNA for HVAC Duct Design, [B2]*. Plenum depth should be equivalent to at least three to four diameters of the duct going to the diffuser.
 - Locate all rotating equipment with static pressure control dampers at least 10 feet from classrooms.
 - Locate HVAC fan equipment serving more than one classroom farther from the classrooms than equipment serving only one classroom.
 - Specify airfoil-shaped blades for centrifugal fans.
 - Do not specify fans with forward curved blades.
 - Lined ductwork shall not be allowed for any SDP project.
 - Do not locate variable air volume (VAV) boxes over learning space, unless measures are taken to meet required acoustic standards for the spaces.
- The following are guidelines related to Electrical design and acoustic performance:
 - Specify low noise light fixture ballasts.

- Locate outlet and junction boxes on opposite sides of a stud wall so that they are separated by at least 24", not within the same stud space.
- Detail construction at boxes located back-to-back in double stud walls so that they are fully enclosed in gypsum board that does not contact the framing of the other row of studs with all joints sealed. Alternatively, use vapor-barrier type boxes that are caulked and sealed.
- The following are guidelines related to Plumbing design and acoustic performance:
 - Locate piping above corridor ceilings rather than habitable spaces.
 - Specify cast iron for waste line piping whenever possible.
 - Specify that any plastic piping shall be wrapped with a lagging material.
 - Specify that any plastic or copper waste piping shall be wrapped with a lagging material and enclosed with gypsum board construction.
 - Specify that all piping be isolated from building walls and structure by using compressible wrapping or resilient clamps and hangers.
 - Where a plumbing wall must be located next to a learning space, design the wall with a 1" gap between double rows of studs plus two layers of gypsum board on the classroom side plus sound-absorbing insulation batts in both stud cavities, or use solid masonry construction.
 - Specify supply water pressure that is reduced as much as possible.
 - Specify water hammer arrestors for supply pipes serving flush or solenoid valve fixtures.
 - Specify water siphon jet fixtures.
 - Do not specify blowout fixtures.
 - Specify inspection of all plumbing for conformance to noise control features before closing the walls.

- The following are guidelines related to Interiors design and acoustic performance:
 - Locate equipment as far from student locations as possible.
 - Design additional sound attenuation features in learning spaces where numerous pieces of equipment may collectively be excessively noisy.

Reverberation

- The reverberation time of a room must be designed based on the sound reinforcement required to create a proper acoustic environment for each space. This must consider the type of sound source (speech, speech and music, or music).
- In general, the following reverberation times shall be achieved for 500, 1,000 and 2,000 Hz for the types of listed spaces.
 - Between 0.6-0.7 second reverberation time: Classrooms, instructional laboratories, instructional media centers, offices, conference rooms, and cafeterias.
 - 1.0 to 2.0 seconds reverberation time: Auditoriums, gymnasiums and music rooms. In general, the acoustic requirements for speech and chamber music, is good below 1.2 seconds and only fair above 1.5 seconds. The reverse is true for orchestral, choral and non-amplified music with a fair condition below 1.5 seconds and good when greater.
 - 1.5 to 2.0 seconds reverberation time: Spectator gymnasium with sound reinforcement. Allowing these gymnasiums to be acoustically lively helps to reinforce school spirit during competitions.

Sound Reinforcement

- Electronic sound reinforcement required for the building needs to be coordinated with the acoustic environment that is designed for the facility.
 - The building public address system needs to be adjusted for volume and location of speakers that provides clear understanding of the message at all locations in the building.

- Public address systems in auditoriums, gymnasiums and cafeteriums also require adjustment of volume and location of speakers that provides clear understanding of the message at all locations in the space.
- Classroom voice enhancement systems need to be fine tuned to the instructional area used in.
- Building bell system and weather and fire alarm systems need to have sound devices located so that every part of the building is provided the sonic signal at the required db level.

CEMENTITIOUS UNDERLAYMENT (Division 3)**Technical Standards**

- At locations of movable partitions, specify installation of concrete topping before partitions are installed.
- Specify substrate preparation shall be in accordance with concrete topping manufacturer's recommendations.
- Specify product that is self-leveling and can be spread to a feather edge.

Preferred Products

Manufacturer: Dayton Superior Corp.

CLOSET AND UTILITY WOOD SHELVING (Division 6)**Design Criteria**

- Avoid inclusion of built-in shelving in closets, except at coat closets, janitor's closets, or other areas specifically requested by SDOP.
- Design and specify adjustable shelving for custom fabricated installations.
- Provide Statement of VOC content for adhesives, sealants, and binders.
- Do not use particleboard or MDF that contains urea formaldehyde.
- Specify FSC certified products.

Preferred Products

(None)

COILING DOORS AND GRILLES (Division 8)

Design Criteria

- Design and detail overhead self-closing coiling doors for openings at countertops in fire rated walls.

Preferred Products

Atlas Door Corp.: Div. of Clopay Building Products Co.
The Cookson co.
McKeon Rolling Steel Door Co., Inc.
Raynor Garage Doors

FIRE EXTINGUISHER & HOSE CABINETS (Division 10)**Technical standards**

- Detail and specify fire extinguisher & hose cabinets that are fully recessed.
- Specify cabinet windows as plastic pull-out type.
- Specify all hose cabinets shall also contain a fire extinguisher.
- Specify cabinet window maintenance stock at 10% of the quantity for each size installed.
- Specify submission of cabinet manufacturer's name, address, and cabinet model number as part of close-out submission package.

Preferred Products**Cabinets:**

Larsen's Manufacturing Company
J.L. Industries, Inc.
Fire-End & Croker Corp.
General Accessory Manufacturing Co.

FIRE EXTINGUISHERS (Division 10)

Technical Standards

- Specify all fire extinguishers according to NFPA-10 utilizing type 'B' or 'C' extinguishers.

Preferred Products

Anerex Corp.

Kidde

Larsen's Manufacturing Company

J.L. Industries, Inc.

Fire-End & Croker Corp.

General Accessory Manufacturing Co.

INTERIOR SIGNS (Division 10)

- All interior signage shall be in compliance with the ADA. Sizes and materials shall be as indicated on the attached drawing entitled “ADA COMPLIANT SIGNAGE”.
- Identify each room and or space and provide a room number. Sign shall also include the maximum allowable occupancy of habitable spaces.

Preferred Products

Capital Sign Systems
Cutler Signs
East Coast Sign
Nordquist Sign Company

INTERIOR WALL LOUVERS (Division 10)**Technical Standards**

- Specify interior louvers and vents shall fabricated in galvanized steel
- Give preference to products made with recycled (post consumer, post industrial) materials
- Provide Statement of VOC content for adhesives and sealants

Preferred Products

Manufacturers: The Airlite Co.
 Airstream Products Division of
 Penn Ventilator Co.

METAL HANDRAILS AND RAILINGS (Division 5)**Design Criteria**

- Design all stairwell handrails as welded pipe construction.
- Design entranceway handrails as manufactured metal systems.

Technical Standards

- Specify SDOP approved color for painted railings.
- Specify galvanized steel for interior and exterior handrails not scheduled for painting.
- Guards may be constructed of steel pipe, bars, rods or finished mesh inserts.
- Give preference to products made with recycled (post consumer, post industrial) materials.

Preferred Products

(None)

OPERABLE PARTITIONS (Division 10)**Design Criteria**

- Design and detail operable partitions only for openings requiring sound rated separation of adjacent spaces. Otherwise, design operable partitions as curtains.

Technical Standards

Panels, Tracks, and Trolleys

- Specify all-welded steel panels with 16 ga. steel faces welded to frames at 8 inches on-center.
- Specify submission of a panel bending load test, a panel tensile load test, and certification of load test of suspension system.
- Specify submission of the following load tests for panels up to 15 ft. high:
 - track/trolley/bracket/hanger rod assemblies - 6,000 lbs at mid-point of 36" span, without damage; trolley capacity to be 900 lbs,
- Specify submission of the following load tests for panels over 15 ft. high:
 - track/trolley/bracket/hanger rod assemblies - 8,000 lbs at mid-point of 48" span, without damage; trolley capacity to be 1,500 lbs.
- Specify submission of sample panel with cut-away that reveals interior construction and dimensions of materials.
- Provide Statement of VOC content for adhesives, sealants, and binders.
- No urea formaldehyde to be used.

Sound Ratings

- Specify an STC of 53 minimum, in accordance with ASTM E90-85
Specify and NIC rating of 42 minimum.

Acoustical Seals

- Specify lever-operated mechanical, retractable bottom seals.
- Specify flexible, multi-fin sweep type top seals.

Coordination

- Specify that Contractor coordinate operable wall and structural steel Shop Drawings.

Warranty

- Specify a 10 year warranty that includes a 10 year maintenance contract.

Preferred Products

Acceptable Track Systems:

Advanced Equipment Corporation #1A SuperTrack
Modernfold #14 Track
Hufcor #11 Track

Acceptable Panel Construction:

Advanced Equipment Corporation 'S' panel
Modernfold #941 Series with 16 ga. steel faces
Hufcor #6500 Series with 16 ga. steel faces (#6960E for electric)

SHEATHING REINFORCEMENT (Division 6)

Technical Standards

- Detail all wall mounted items supported by either solid wood blocking or 14 gauge sheet steel. Coordinate with equipment and accessories schedules.

Preferred Products
(None)

TELEPHONE ENCLOSURES (Division 10)

Design Criteria

- Telephone enclosures are procured directly from the telephone Company and are NIC.

Preferred Products

(None)

TOILET ACCESSORIES (Division 10)**Design Criteria and Technical Standards**

- Schedule and specify toilet accessories as follows:

STUDENT & PUBLIC TOILET ROOMS

- ASI Model #8026 Frameless Stainless Steel Mirror 18"x30" above lavatory.

- Accessible mirror, according to ADA regulations.
- Bobrick Model B-2112, surface mounted Liquid Soap Dispenser mounted directly above each lavatory.
- ASI Model #0030 Toilet Paper Dispenser surface mounted on toilet stall partition (provide 50% spare units for storage onsite).
- Do not specify Sanitary Napkin Dispenser/receptacles.
- ASI Model #8522 roll-types, surface mounted Paper Towel Dispenser. Provide number equal to ½ lavatory count.
- 40 gallon stainless steel or wire mesh, free standing Waste Receptacle.
- ASI Model #3200 1-1/2" diameter Grab Bars at accessible toilets, in accordance with ADA regulations (use one way screws, contractor to de-burr all fasteners, trim, and brackets).

FACULTY AND STAFF PRIVATE TOILET ROOMS

- ASI Model #0600 Stainless Steel Angle Frame Mirror 18"x30", mounted above sink.
- Provide one ASI model #0600 Stainless Steel Angle Frame Mirror 24"x60" per toilet room.
- Bobrick Model B-2112, surface mounted Liquid Soap Dispenser mounted directly above each lavatory.

- ASI Model #0263-1 single roll Toilet Paper Dispenser, surface mounted on toilet stall partition.
- ASI Model #8522 roll type, surface mounted Paper Towel Dispenser. Provide one in each room.
- Clothes hook at inside of each toilet compartment door.
- Paper cup dispenser near lavatories.
- Do not specify Sanitary Napkin Dispenser/receptacles.

SHOWER ROOMS AND STALLS

- Shower head adjustable spray, no swivel.
- Grab bars in accordance with ADA regulations.
- (Specify ceramic soap dishes in Division 9 - Finishes)

ATHLETIC LOCKER ROOMS

- Metal framed, full-length mirror.

JANITOR'S CLOSET

- Clip type Mop Holder, 4 mops.
- One tier of non-rusting Metal shelving to as great an extent as possible.
- Bobrick Model B-2112, surface mounted Liquid Soap Dispenser mounted directly above each sink.
- ASI Model #8522 roll-types, surface mounted Paper Towel Dispenser provided each sink & Mop holders.

TOILET COMPARTMENTS (Division 10)

Design Criteria

- Design toilet compartment sizes to be the following minimum sizes:
 - Compartments for Girls: 2'-6" X 4'-6"
 - Compartments for Boys: 2'-6" X 4'-0"
 - Compartments for ADA per ADA.
- Design the bottom of toilet partitions to be 1'-0" AFF.
- Design the top of toilet partitions to be 5'-10" AFF.
- Provide appropriate accessible toilet compartments with special attention to door swings.

Technical Standards

- Private: Specify Santana Hiny-Hider, Solid Resin Toilet Compartment Partitions and Doors, color: Black Paisley with Stainless steel surface mounted hinges, provide coat hanger/stop. Use one way screws, contractor to de-burr all fasteners, trim and brackets.
- Public: Specify Santana Hiny-Hider, Solid Resin Toilet Compartment Partitions and Doors, color: Black Paisley with stainless steel surface mounted hinges, DO NOT provide coat hanger/stop. Use one way screws, contractor to de-burr all fasteners, trim and brackets.
- Provide LEED credit documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.
- Provide LEED credit documentation indicating location of product manufacturing, extraction, and processing of materials, including costs for products.

Preferred Products

Santana

STAIRS (Division 5)**Design Criteria**

- Design interior stairs as concrete filled metal pan type unless price competition indicates cost advantage with poured-in-place concrete.
- Continue design dimensions and profiles of stair stringer in design of base at walls of landings.
- Design metal deck stairs, without concrete fill or rubber treads, only as minimum quality in non-student areas.
- Do not design open riser stairs.
- Provide an area of refuge at each floor of all Stair Towers. Each area of refuge shall be provided with a two-way communication system between the area of refuge and a central control point as approved by the fire department. Each door providing access to an area of refuge from an adjacent floor area shall be identified by a sign stating: AREA OF REFUGE, including the International Symbol of Accessibility. Area of Refuge shall be designed in accordance with the requirements of the ICC 2003 International Building Code, Chapter 10 – Means of Egress, Section 1007 and shall comply with ICC/ANSI A117.1-1998.

Technical Standards

- Do not specify abrasive nosing on metal stairs; only on poured concrete stairs.
- Give preference to products made with recycled (post consumer, post industrial) materials.

Preferred Products

- Alfab, Inc.
- American Stairs, Inc.
- Sharon Companies Ltd.

Interior Finishes for Service Spaces**Mechanical Equipment Room****Floor: Previously coated concrete –**

- Single component floor coating with non-skid additive
Rich Lux Patio and Deck Enamel
- 2-component Water Based Epoxy with non-skid additive –
Concrete Saver Water Based Epoxy 6000 system

Bare concrete –

- 2-component, solvent-based epoxy with non-ski additive -
Ply-Mastic 650 Epoxy
- 2-component Water Based Epoxy with non-skid additive –
Concrete Saver Water Based Epoxy 6000 system

Base: Same as walls and ceilings

Walls and Ceilings:

Concrete and Masonry:

- Primer - Interior flat latex, low odor, ready mixed
- 1st coat - Rich Lux Latex Sealer Undercoat
- 2nd coat - Fresh Kote Latex Flat (402)
- 3rd coat - Fresh Kote Latex Flat (402)

Equipment:

Ferrous Metals:

- 1st coat - MAB Rust-O-Lastic Anti-Corrosive Primer (073)
- 2nd coat - MAB Rust-O-Lastic gloss enamel (074)
- 3rd coat - MAB Rust-O-Lastic gloss enamel (074)

Galvanized Metal:

- 1st coat - Rust-O-Lastic Hyrdro-Prime II, (073)
- 2nd coat - MAB Rust-O-Lastic gloss enamel (074)
- 3rd coat - MAB Rust-O-Lastic gloss enamel (074)

Final Color Coat:	
Walls, Ceiling above shadow line.	White
Walls, Ceiling below 6ft AFF.....	Alabaster (MAB #7007)
Pipe Hangers, pipe supports.....	Aluminum (MAB #74-087 alkyd)
Exposed Pipe Flanges.....	Red (MAB #7099, 43-452 acrylic)
Natural Gas Line (heating).....	Regal Yellow (MAB #7082)
Natural Gas Line (dom. water).....	Caution Yellow (MAB #7082, 43-329 acrylic)
Natural Gas Vent Line.....	Caution Yellow (MAB #7082)
Fuel Oil Line.....	International Orange (MAB # 7007)
Structural Columns.....	Battleship Blue (MAB # 7048)
Equipment Foundations.....	Alabaster (MAB #7007)

ACOUSTICAL CEILINGS (Division 9)**Design Criteria**

- Design and schedule all ceilings as suspended acoustical tile systems, except as otherwise provided for in rooms scheduled for Portland cement plaster ceilings.
- Design facias as gypsum board. Do not design or detail acoustical tile facias.
- Design and detail soffits less than 2'-0" as gypsum board, and greater than 2'-0" as ceiling tile.
- Carefully specify color and style of new ceiling tiles and suspension grids to match existing. Indicate painting of grid if necessary.
- Ceilings in areas of abuse (i.e. Locker rooms & Toilet rooms) shall be fiber reinforced plastic (FRP) systems including suspension system and ceiling tile.

Plaster Fab. Standards calls for Portland Cement Plaster.

Technical Standards

- Design and specify acoustical tile size as 2' x 4'.
- Do not specify acoustical tile size as 2' x 2'.
- Specify water resistant & washable ceiling tiles in the following areas:
 - Food Preparation Areas
 - Other Wet Areas as requested by SDOP.
- Specify heavy duty suspension system at special ceilings.
- Specify formaldehyde – free or low VOC content.
- Specify sequence of work to avoid exposing acoustic ceiling systems to VOC from other products such as paint and adhesives.
- Specify products manufactured within 500 miles of project.

- Specify products that are 100% recyclable.
- Provide LEED credit documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.
- Provide LEED credit documentation indicating location of product manufacturing, extraction, and processing of materials, including costs for products.
- Specify products with VOC content certification.
- Specify manufacturers with recycling program.
- Meet Calif. Dept. of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small Scale Environmental chambers, including 2004 Addenda.

Preferred Products

Ceiling tiles

Certain Teed
Ecophon
BPB Celotex

Suspension System

□ Armstrong World Industries

C 30 Interior Finishes

ACOUSTICAL INSULATION (Division 9)

- Detail and schedule sound attenuation blankets in gypsum board assembly partitions at mechanical equipment rooms, Principal's office, administrative offices, conference rooms, medical rooms, and other rooms as requested by SDOP.
- Specify acoustical boots at ceiling plenum air return grilles in rooms with sound rated partitions.
- Provide LEED credit documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.
- Provide LEED credit documentation indicating location of product manufacturing, extraction and processing of materials, including costs for products.

Preferred Products

Certain Teed Corp.
Johns Manville Corp.
Owens Corning.

ATHLETIC WOOD FLOORING (Division 9)**Design Criteria**

- Design hardwood maple flooring for spaces that will have athletic uses only.
- Design synthetic resilient flooring for spaces that will have activities in addition to athletic uses.
- Design athletic spaces that are to have wood floors at locations above grade, wherever possible.
- Design “salvageable” installation systems minimizing use of adhesive such as floating or nail down systems.

Technical Standards

- Coordinate HVAC design with the following year-round criteria for spaces with athletic wood floors:
 - Indoor temperature: 55 deg. F. to 75 deg. F.
- Specify that technical standards follow recommendations of the Maple Flooring Manufacturers Association, (MFMA).
- Do not specify staining or bleaching of maple floors.
- Specify nailing, stapling, and fastening of sub-floor components at 12” O.C. maximum.
- Specify seam-sealed polyethylene vapor barrier for floating floor systems.
- Specify seam-sealed, closed-cell foam vapor barrier for fixed-system installations and those that are below grade.
- Specify that use of wood fillers is not permitted.
- Specify that sub-floor concrete slabs be flat to a tolerance of 1/8” in a 10’ radius.

- Specify that placing any material between the below-slab vapor barrier and the concrete slab, including sand, is not permitted.
- Specify that floor system manufacturer be consulted with regard to bleacher blocking requirements.
- Specify that American Concrete Institute, (ACI), Ff/FI standards for concrete slab flatness and levelness not be applied to concrete slabs beneath athletic wood floors. Refer to MFMA standards and definitions.
- Specify certified rebound performance of athletic floors is to be in accordance with the international D.I.N. #18032, Part 2 standards.
- Specify that athletic wood flooring shall not be installed over new concrete slabs within 60 days of pour.
- Specify that measurement of moisture in newly-poured concrete slabs shall not be performed by using electronic moisture meters.
- Specify that moisture be identified in newly-poured concrete slabs as the quantity of moisture passing through the slab, at a rate of 4.5 lbs. or less of vapor emissions per 1000 sq. ft. in 24 hours.
- Specify that if ACI Ff/FI standards are applied to concrete slabs beneath athletic wood floors, the following conditions must be met:
 - The F-Number measurement must be taken no less than two (2) weeks prior to installation of the wood floor.
 - The measurement process must include all construction joints over the entire concrete slab.
 - The MFMA flooring installer must be present during the entire measurement process.
- Specify expansion spacing (“washer rows”) using either 1/16” or 1/8” washers, at the discretion of the flooring installer, and depending on current and anticipated climatic conditions.
- Specify that 1 ½” – 2” expansion voids shall be provided at the floor perimeter and at anchors for fixtures, equipment or bleachers in floating floor systems and that they are to be maintained free of debris or other obstructions until enclosed.
- Specify 4” minimum spacing between end joints of adjacent floor boards.

- Specify that face-nailing of floor boards shall be countersunk and filled with a mixture of maple dust and floor finish.
- Specify that water-based floor finishes shall be used with great caution, in order to avoid side-bonding and “penalization”.
- Specify that painting of solid areas shall be performed during coldest/driest weather, whenever possible.
- Specify topical application of water repellent/preserver. Do not specify pressure treatment with Wolman salts.
- Specify manufactured within 1000 miles of project.
- Specify product that has been certified by the FSC (Forest Stewardship Council).
- Provide LEED credit documentation of manufacturers product data for wood sports floor assembly installation adhesives, including printed statement of VOC content clearly indicating compliance with LEED-NCv2.2 VOC requirements.
- Provide LEED credit documentation of manufacturers’ product data for transparent finishes and game line and marker paints, including printed statement of VOC content clearly indicating compliance with LEED-NCv2.2 VOC requirements.

Preferred Products

Wood Flooring Connor Robbins
 Action Flooring Systems
 Horner Flooring Company

Wood Preserver Kop-Coat, Woodlife F

BASIC INTERIOR FINISHES (Division 9)**Design Criteria and Technical Standards**

- Design and specify glazed CMU as base for CMU walls and partitions.
- Schedule and specify finish materials and colors according to the following finish schedule format:
 - Substrate Material
 - Finish Material
 - Color (material specification)
- Specify that certified proof of Flame Spread and Smoke Developed is to be submitted for all flammable finishes.
- Specify shades of color other than white for VCT floor tiles.
- Do not specify vinyl tread covers at stairs.

CARPET (Division 9)

Technical Standards

- Schedule and specify **carpet** as follows:

Construction: textured graphics, **loop pile**

Width: choice of **9 feet or 12 feet** broadloom or **2'x2' carpet tile**

Face Yarn: **100% DuPont Type 6.6 CF Nylon** with permanent static control and soil-resistant technology

Pile Thickness: 0.102

Gauge: 1/10

Stiches/Inch: 12.0 per inch

Edge Ravel: life of the **carpet warranty** (wet or dry)

Tuft Bind: life of the **carpet warranty** (wet or dry)

Dye Method: **Solution/Yarn**

Yarn Weight: 26 oz.

Stock Width: 12 feet

Density: 9,176

Primary

Backing: **100% synthetic**

Secondary

Backing: high performance **polymeric composite**

Seams: chemically weldable **seams**

Recycling: DuPont **Recycling** Program

Federal Flame Standard (pill test):

passes ASTM-D-2859

Optical Smoke Density Requirements:

ASTM 662-79, less than 450

Smoke Density Chamber

(NFPA 258)

- Specify that concrete must be sufficiently **cured, dried and sealed** before carpet is installed over it.
- Provide documentation indicating compliance with testing and product requirements of Carpet and Rug Institute's "Green Label Plus" program.
- Provide LEED credit documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.

- Provide LEED credit documentation indicating location of product manufacturing, extraction, and processing of materials, including costs for products.
- For installation adhesive, provide manufacturers product data (MSDS) including printed statement of VOC content.
- Specify carpet Meet Calif. Dept. of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small Scale Environmental chambers, including 2004 Addenda.
- Specify water and mildew resistant, non staining adhesives.

Preferred Products

Mohawk Industries, Inc.
Bigelow Commercial
Mannington Commercial
Design Weave

CERAMIC TILE (Division 9)**Design Criteria**

- Design ceramic tile as full height finish in the following spaces:
 - Student Toilet Rooms – Verify & coordinate with finish schedule
 - Food Preparation Areas – Quarry Tile
- Design and specify that existing ceramic tile in rooms scheduled for renovation be demolished to accommodate all new material.
- Do not select ceramic tile types or colors that have been discontinued by manufacturer.
- Design ceramic tile wall surfaces to extend behind toilets, urinals, and lavatories.
- Design ceramic tile wall surfaces in all service closets, to extend behind sinks and mop receptors.
- Design with and specify quarry tile sizes as 9" x 9" or 12" x 12".
- Design with and specify ceramic floor tiles as 2"x2" and ceramic wall tiles as 4-1/4" x 4-1/4"
- Within a two-foot square area around floor drains, the size of tile may be decreased as may be required.

Technical Standards

- Specify glazed ceramic tile for wall tiles.
- Detail and specify thin-set material as setting method for ceramic tile, as recommended by manufacturer.
- Do not detail or specify stone saddle at transition of ceramic tile floor to other finishes. Detail ceramic tile with bull nose edge.

- Specify products with recycled (post consumer, post industrial) content.
- Provide statement of VOC content for adhesives.

Preferred Products

American Olean: Div. of Dal-Tile International Corp.

Daltile: Div. of Dal-Tile International Corp.

COLOR MATERIALS IN ELEMENTARY SCHOOLS

Design Criteria

- Do not use neutral colors (achromatic hues) such as white, black, grey, dark brown, off-white, etc.
- Use warm base colors, such as salmon, beiges, soft yellows, peach, etc.
- Use accent colors of more saturated hues, such as red, yellow, blue, violet, orange, and green.
- Avoid overuse of deeply saturated bright hues.
- Consider use of color in “wayfinding.”
- Avoid use of one color throughout all surfaces of a space.

Technical Standards

- Specify carpet that is dark, multicolor to hide staining and soiling. The color value of the carpet should be at least as dark as value #6 on a gray scale, but do not use black.
- Specify tile grout to be a tinted shade, (never white, light gray, or cream). The color value of the grout should be at least as dark as #6 on a gray scale.
- Specify stage walls shall be painted black or dark gray, unless the space is multi-use.
- Specify stage floors shall be a dull, dark stain, or black to avoid the reflection of stage lighting.
- Specify that the contrast of the background of a wall writing surface and the color of the written message be as great as possible. (Black or dark gray for white or yellow chalk; white marker board for markers)

- Specify colors of primary surfaces of rooms with computers, to have a 3:1 contrast ratio, and the following light reflectance's:
 - Walls 50% - 60%
 - Floors 20% - 30%
 - Furniture 30% - 50%
- Specify colors of work surfaces that will contrast slightly to a piece of paper or page of a book.
- Consider specifying photometric analysis of mockups of proposed color schemes to identify and validate light reflectance.

Preferred Products

(None)

Commentary – Color Materials

Color in Schools

1. Although color can be one of the most influential elements in the design of an educational facility, it is often not given appropriate attention in the design process, but rather develops as a result of product availability, color trends, ease of maintenance, or personal subjective preferences of those involved in selecting colors, instead of more scientific principals. The appropriate use of color is important in protecting eyesight and preventing eyestrain, thereby creating surroundings that provide a balance of stimulation and a sense of security.
2. While developing standard palettes of colors for all schools would not be practical or beneficial, there are guidelines that can be used for the use of color and light in K-12 environments.
3. The reaction to, and influence of, color differs according to age groups. Children will, to some extent, view color differently than adults. Their eye and brain development is at a different stage than adults, and at younger ages, they have not been as influenced by marketing trends. Different age groups in K-12 schools will vary in response to color as well.

Recommendations for Use of Color in Elementary Schools

1. Environments of a color palette made completely of neutral colors (achromatic hues) such as blacks, whites, grays, even dark browns, and off-whites should be avoided. Lack of light wavelengths (colors of a variety of hues) have been shown to increase nervousness, anxiety, and insecurity in Dr. Harry Wohlfarth's, "*Effects of Color and Light on the Development of Elementary School Pupils*," twelve month study from 1982-1983. These colors have been shown to be rejected or disliked by children ages 5-12 by Heinrich Friel's Institute of Color Psychology, "*Study of Children's Color Preferences all Over the World*."
2. Warm base, background colors such as salmon, beiges, soft yellows, or peaches on the walls have a tendency to compliment the extroverted nature of younger children, thus reducing tension, nervousness, and anxiety. Accent colors of more saturated hues of all colors will provide a moderate amount of stimulation as well as providing eye muscle relief to the warm lighter walls, according to Frank A. Mahnke, Founder and Director of the American Information Center for Color and Environment.

3. Avoid overuse of deeply saturated bright hues on all architectural elements, (walls, floors, ceilings, and bulkheads), as this will create too much stimulation and children will have a hard time focusing.
4. Humans, especially children, can relate to the visual stimulus of color as an indication of location or special relationship. Color, therefore, provides an excellent element for “way finding” in a building. Areas of the building can be identified by use of color on certain interior elements. Different corridors, classroom pods, clusters, or wings of a building could be color-coded to help children develop a sense of location in a large school. Note that the entire space in an area should not become one color, (walls, lockers, flooring, casework), but rather, use one or two elements such as tack boards, signage, an occasional floor tile as a color accent that is consistent in each area of the building. When asked their preference, children ages 5-12 preferred and related to primary and secondary colors such as yellow, red, blue, violet, orange, and green, (Heinrich Friely, Institute of Color Psychology, “*Study of 10,000 Children’s Color Preferences all Over the World*”).
5. As age increases, preferences are developed for more tertiary colors, in shades and tones of the primary and secondary color group.
6. As adults create environments for children, we should not allow our preferences to avoid the use of these preferred colors as accents and focal points throughout an elementary school.

COLOR MATERIALS IN HIGH SCHOOLS

Design Criteria

- Do not use neutral colors (achromatic hues) such as white, black, grey, dark brown, off-white, etc.
- Use warm base colors, such as salmon, beiges, soft yellows, peach, etc.
- Use accent colors of more saturated hues, such as red, yellow, blue, violet, orange, and green.
- Avoid overuse of deeply saturated bright hues.
- Consider use of color in “way finding.”
- Avoid use of one color throughout all surfaces of a space.
- Use the school colors in athletic areas and on lockers.

Technical Standards

- Specify carpet that is dark, multicolor to hide staining and soiling. The color value of the carpet should be at least as dark as value #6 on a gray scale.
- Specify tile grout to be a tinted shade, (never white, light gray, or cream). The color value of the grout should be at least as dark as #6 on a gray scale.
- Specify stage walls to be painted black or dark gray, unless the space is multi-use.
- Specify stage floors to be a dull, dark stain, or black to avoid the reflection of stage lighting.
- Specify that the contrast of the background of a wall writing surface and the color of the written message be as great as possible. (Black or dark gray for white or yellow chalk; white marker board for markers)

- Specify colors of primary surfaces of rooms with computers, to have a 3:1 contrast ratio, and the following light reflectance's:
 - Walls 50% - 60%
 - Floors 20% - 30%
 - Furniture 30% - 50%

- Specify colors of work surfaces that will contrast slightly to a piece of paper or page of a book.

- Consider specifying photometric analysis of mockups of proposed color schemes to identify and validate light reflectance.

Preferred Products

(None)

Commentary – Color Materials

Color in Schools

1. Although color can be one of the most influential elements in the design of an educational facility, it is often not given appropriate attention in the design process, but rather develops as a result of product availability, color trends, ease of maintenance, or personal subjective preferences of those involved in selecting colors, instead of more scientific principals. The appropriate use of color is important in protecting eyesight and preventing eyestrain, thereby creating surroundings that provide a balance of stimulation and a sense of security.
2. While developing standard palettes of colors for all schools would not be practical or beneficial, there are guidelines that can be used for the use of color and light in K-12 environments.
3. The reaction to, and influence of, color differs according to age groups. Children will, to some extent, view color differently than adults. Their eye and brain development is at a different stage than adults, and at younger ages, they have not been as influenced by marketing trends. Different age groups in K-12 schools will vary in response to color as well.

Recommendations for Use of Color in High Schools

1. Many of the recommendations for elementary schools are applicable to secondary schools.
2. Avoid a palette of achromatic hues.
3. Warm base colors, (beige, light yellows, taupes, and peaches) on the walls will make one feel warmer than the actual temperature. This may be very beneficial in the Philadelphia winter climate. Lighter shades of blue and green have been shown to elicit a sense of calmness, thus providing an environment conducive to concentration. Such colors could be applicable in classrooms and the IMC. A precise shade of pink, (Pepto-Bismol Pink), has been demonstrated to have a profound calming effect on highly agitated, even violent behavior. When placed in a room painted entirely in this color, agitated individuals have been dramatically calmed within 15 minutes. (Exposure to this color for more than 15 minutes tends to recall the agitated state.)
4. “Softer surroundings created by subtle and/or cooler hues have centripetal action which enhances the ability to concentrate. Beige,

pale or light green, and blue-green are appropriate and they permit better concentration by providing a passive effect,” according to Frank H. Mahuke’s, *“Color, Environment and Human Response.”*

5. If a wall in a space is indicated as the primary teaching wall or focus of presentation, a darker hue of a color on the wall will pull one’s attention toward that wall.
6. School colors should be considered and discussed as to how and whether they should be incorporated into the overall color scheme. School colors are usually used in the athletic areas. Locker specifications should include the school colors for the finish.

COATINGS FOR CONCRETE and MASONRY (Division 9)**Technical Standards**

- Specify block filler prime coat on all CMU.
- Do not specify painting of concrete floors, except as directed by SDOP.
- Specify concrete floor sealers that are easily cleanable and that can withstand heavy duty traffic.
- Specify manufactured within 500 miles of project
- Specify products with low or no VOC

Preferred Products

Duron
Superior Epoxies and Coatings
Garon Products, Inc.

FLUID APPLIED RESILIENT FLOORING (Division 9)**CUPRIC OXYCHLORIDE CEMENT FLOORING SYSTEM****Technical Standards**

- Specify that installer and all application employees are pre-qualified by the COC flooring system manufacturer.
- Specify that existing substrates are prepared according to COC flooring system manufacturer's recommendations.
- Specify Meet Calif. Dept. of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small Scale Environmental chambers, including 2004 Addenda.
- Provide Statement of VOC content for all sealants and adhesives.

Preferred Products

COC Flooring
System: Hubbellite International, Inc.

FURRING AND LATHING (Division 9)**Design Criteria and Technical Standards**

- Design, detail, and specify galvanized control joints located at 10' to 12' maximum spacing, vertically and horizontally. Locate joints with consideration of unified appearance and design.
- Specify metal lath to have 1" overlaps at edges.

Preferred Products

(None)

GYPSUM WALL BOARD (Division 9)

- Gypsum wall board used shall be minimum 5/8 inch thick and as follows:
 - Any spaces normally accessible to students shall be Abuse/Impact resistant gypsum wall board meeting ASTM C36 and C1278 with long edges tapered.
 - All board that is placed on an exterior wall application shall be foil backed.
 - All gypsum board assemblies shall have control joints installed at a maximum of 30-foot intervals.
 - All joints and fastener locations shall be taped and finished. (Simply fire taping above ceilings is not acceptable.)
 - Non-load-bearing steel framing shall comply with ASTM C754 and ASTM C840.
 - Give preference to products manufactured within 500 miles of project.
 - Specify non-toxic glue/adhesive.
 - Specify products with no less than 50% recycled content.
 - Specify gypsum cutoffs to be reclaimed and recycled.
 - Provide LEED credit documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.
 - Provide LEED credit documentation indicating location of product manufacturing, extraction, and processing of materials, including costs for products.
 - Provide LEED credit documentation of Manufacturers product data for adhesives used to laminate gypsum board panels to substrates, including printed statement of VOC content clearly indicating compliance with LEED- NCv2.2 VOC requirements.

Preferred Products

American Gypsum Co.

National Gypsum Co.
USG Corporation

INTERIOR PAINT SCHEDULE – NEW CONSTRUCTION- L.E.E.D.

The paint product data indicated here were selected from the *MAB Paints and Coating Specification Manual*. Products by others must be equal as approved by the School District of Philadelphia, department of Design, Construction, and Capital Projects.

CONCRETE AND MASONRY (not including CMU)

Water-Reducible, single component Acrylic Epoxy, Eggshell – 150 g/L

Primer:	Rich Lux Latex Sealer Undercoat	037-154
1 st Coat:	HydroKote	012
2 nd Coat:	HydroKote	012

Water-Reducible Acrylic Epoxy, Semi-Gloss – Zero VOC g/L

Primer:	Rich Lux Latex Sealer Undercoat	037-154
1 st Coat:	Sierra S-16 semi-gloss	
2 nd Coat:	Sierra S-16 semi-gloss	

CONCRETE MASONRY UNITS (CMU)

Acrylic Eggshell Finish

Classrooms and other instructional related spaces

Water-Reducible, single component, Acrylic Epoxy. Eggshell – 150 g/L

Filler:	Block Kote #2000	064-140
1 st Coat:	HydroKote	012
2 nd Coat:	HydroKote	012

Acrylic Semi-Gloss Finish

Stairwells and corridors

Water-Reducible Acrylic Epoxy, Semi-Gloss – Zero VOC g/L

Filler:	Block Kote #2000	064-140
1 st Coat:	Sierra S-16 semi-gloss	
2 nd Coat:	Sierra S-16 semi-gloss	

Zero VOC type Epoxy Semi-Gloss -

Areas subjected to high humidity and moisture

Filler:	Block Kote #2000	064-140
2 nd coat:	Sierra S-50/51 series	
3 rd coat:	Sierra S-50/51 series	

CONCRETE FLOORS

Water –Reducible Epoxy, Satin - Zero VOC g/L

1 st Coat	Sierra Two-part water borne	S42 series
2 nd Coat	Sierra Two-part water borne	S42 series

GYPSUM WALL BOARD

Acrylic Eggshell Finish

Classrooms and other instructional related spaces

Water-Reducible, single component, Acrylic Epoxy. Eggshell – 150 g/L

Primer:	Rich Lux Latex Sealer Undercoater	037-154
1 st Coat:	HydroKote	012
2 nd Coat:	HydroKote	012

Acrylic Semi-Gloss Finish

Stairwells and corridors

Water-Reducible Acrylic Epoxy, Semi-Gloss – Zero VOC g/L

Primer:	Rich Lux Latex Sealer Undercoater	037-154
1 st Coat:	Sierra S-16 semi-gloss	
2 nd Coat:	Sierra S-16 semi-gloss	

Zero VOC type Epoxy Semi-Gloss -

Areas subjected to high humidity and moisture

Filler:	Block Kote #2000	064-140
2 nd coat:	Sierra S-50/51 series	
3 rd coat:	Sierra S-50/51 series	

WOOD - OPAQUE FINISH

Acrylic Low-Luster Finish

Primer:	Rich Lux Latex Sealer Undercoater	037-154
1 st Coat:	Rich Lux Low Lustre Latex Enamel	028
2 nd Coat:	Rich Lux Low Lustre Latex Enamel	028

Acrylic Semi-Gloss Finish

Primer:	Rich Lux Latex Sealer Undercoater	037-154
1 st Coat:	Rich Lux Latex Semi-gloss Enamel	023
2 nd Coat:	Rich Lux Latex Semi-gloss Enamel	023

WOOD - TRANSPARENT FINISH AND STAINED FINISH

Water -Based Satin-Varnish Finish

Filler Coat:	Paste -wood filler	
Stain Coat:	water based stain	VOC: 250 g/L or less
1 st Coat:	Water Based urethane	VOC: 350 g/L or less
2 nd Coat:	Water Based urethane	VOC: 350 g/L or less

Water-Based Clear/Natural Finish –

1 st Coat:	Water Based urethane	VOC: 350 g/L or less
2 nd Coat:	Water Based urethane	VOC: 350 g/L or less

FERROUS METAL

Acrylic Low-Luster Finish

Primer:	Rust-O-Lastic Hydro Prime	073-189
1 st Coat:	Rich Lux Low Lustre Latex Enamel	028
2 nd Coat:	Rich Lux Low Lustre Latex Enamel	028

Zero VOC type Epoxy Semi-Gloss

Corrosive Environment

1 st coat:	Sierra S-70 Epoxy Primer
2 nd coat:	Sierra S-50/51 Series
3 rd coat:	Sierra S-50/51 Series

High-Temperature Finish

Radiators and high-temperature pipes (up to 250 deg. F) *

Primer:	(None)	
1 st Coat:	Rust-O-Lastic Acrylic Aluminum	043
2 nd Coat:	Rust-O-Lastic Acrylic Aluminum	043

* Note: Contractor shall provide ample time for off gassing of paint in accordance with manufacturer's recommendations prior to occupancy of affected space. Radiators shall be run for a minimum of 24 hours after painting.

NON-FERROUS METAL

Acrylic Finish

New zinc-coated metal and aluminum

Pre-Treatment:	Galvanize Prep	
Primer:	Rust-O-Lastic Hydro Prime	073-189
1 st Coat:	Rich Lux Low Lustre Latex Enamel	028
2 nd Coat:	Rich Lux Low Lustre Latex Enamel	028

EXTERIOR PAINT SCHEDULE

The paint product data indicated here were selected from the *MAB Paints and Coating Specification Manual*. Products by others must be equal as approved by the School District of Philadelphia, department of Design, Construction, and Capital Projects.

CONCRETE, MASONRY, AND STUCCO (not including CMU)

Primer:	Sea Shore Acrylic Primer	056-958
1 st Coat:	Sea Shore Acrylic Flat	061
2 nd Coat:	Sea Shore Acrylic Flat	061

CONCRETE MASONRY UNITS (CMU)

Filler:	Block Kote # 2000	064-140
1 st Coat:	Sea Shore Acrylic Flat	061
2 nd Coat:	Sea Shore Acrylic Flat	061

WOOD - OPAQUE FINISH

Primer:	Sea Shore Acrylic Primer	056-958
1 st Coat:	Sea Shore Acrylic Trim Enamel	024
2 nd Coat:	Sea Shore Acrylic Trim Enamel	024

FERROUS METAL

Acrylic Finish

Primer:	Rust-O-Lastic Hydro Prime	073-189
1 st Coat:	Sea Shore Acrylic Trim Enamel	024
2 nd Coat:	Sea Shore Acrylic Trim Enamel	024

NON-FERROUS METAL

Acrylic Finish

Pre-Treatment:	Galvanize Prep	
Primer:	Rust-O-Lastic Hydro Prime	073-189
1 st Coat:	Sea Shore Acrylic Trim Enamel	024
2 nd Coat:	Sea Shore Acrylic Trim Enamel	024

--END--

PLASTER FABRICATIONS (Division 9)**Design Criteria**

- Specify veneer coat plaster in lieu of gypsum board assemblies in wet areas and areas of high abuse. Do not mix veneer coat systems with gypsum board systems.

Acoustical Ceiling Standards call for FRP.

- Ceilings in areas of potential vandalism shall be Portland cement plaster on metal lath. Use a 3 coat system of ASTM C-150, type 1. Metal lath and metal accessories shall be ASTM B69, 99% pure zinc.

Preferred Products

(None)

RESILIENT FLOORING (Division 9)**Design Criteria**

- Do not design VCT to be on substrates of lightweight aggregate concrete having a density less than 90 pounds per cubic foot or cellular concrete having a density less than 100 pound per cubic foot.
- Design VCT patterns, including borders, with no more than three colors. Note number of colors to be used in specifications.

Technical Standards

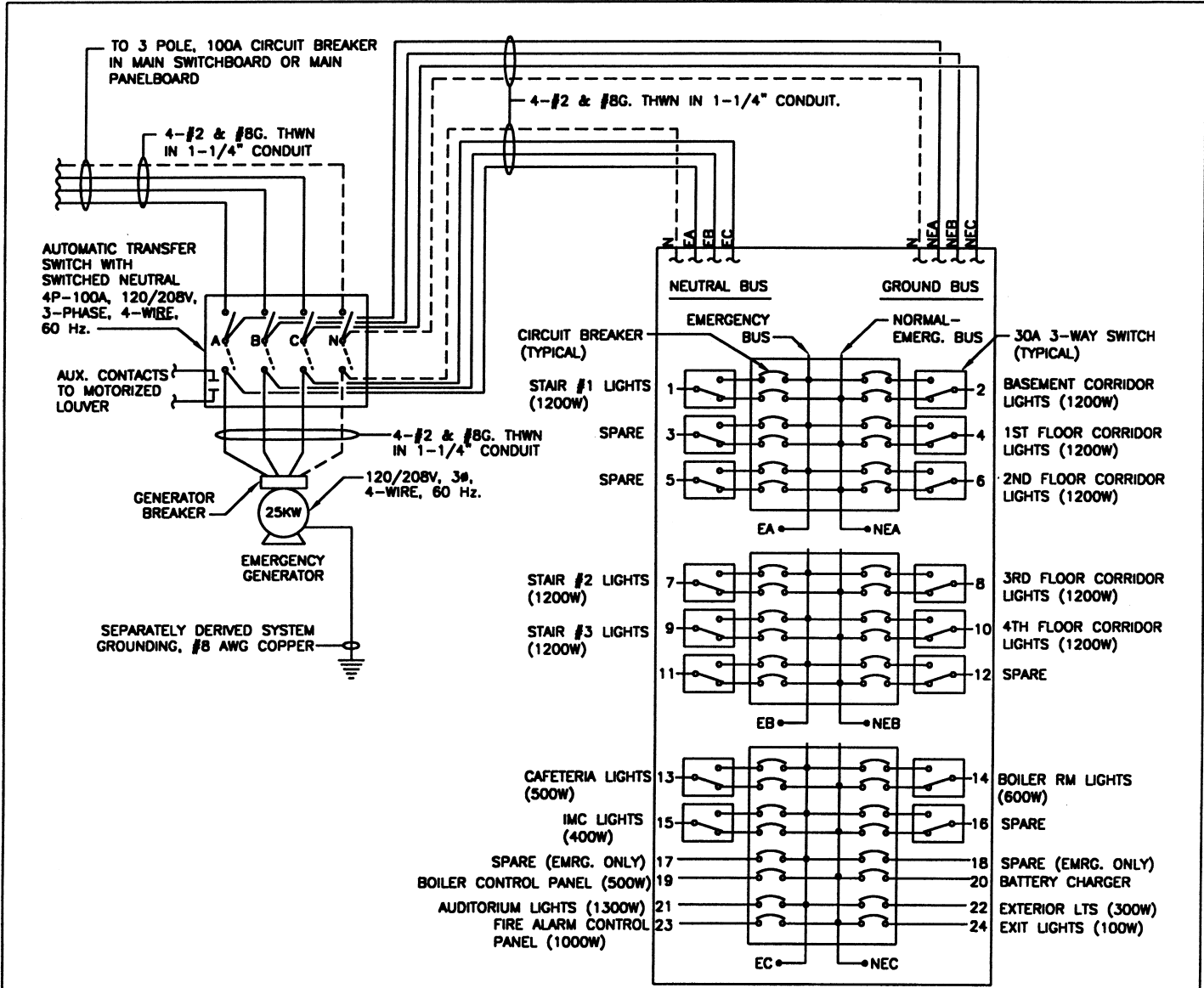
- Specify that curing agents, sealers, or hardeners on new or existing concrete substrates be removed prior to installation of VCT.
- Specify slip resistant tiles in the following areas:
 - ramps
 - toilet rooms not scheduled for ceramic tile
 - stairways and landings
 - home economics classroom kitchens
 - elevators
 - shop areas
 - beneath water coolers and water fountains
 - adjacent to exterior doors
- Specify VCT size to be 12" X 12".
- Specify field tiles with directional patterns to be oriented in same direction.
- Do not specify solid color VCT.
- Specify maintenance stock to be a minimum of 10% of each type and color used for projects up to 100K SF and 5% of each type and color used for projects over 100K SF.
- Specify transition strips to be vinyl.
- Coordinate specification of setting materials with low VOC requirements.
- Specify VCT base height to be 4", or higher if a higher existing base has been removed.

- Specify VCT cove base at VCT floor finishes, and VCT straight base at carpet floor finishes.
- Specify base seams to be a minimum of 12" from corners.
- All exterior base corners shall be molded corners installed prior to runs common to them.
- Provide Statement of VOC content for adhesives.
- Specify Meet Calif. Dept. of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small Scale Environmental chambers, including 2004 Addenda.

Preferred Products

VCT: Armstrong World Industries, Inc.
Dynamit Noble of America, Inc.
James Halstead Ltd.
Tarkett Inc.
Mannington Commercial

Vinyl Base: Roppe



100A, 120/208V, 3 ϕ , 4-WIRE, SPLIT BUS NORMAL-EMERGENCY PANEL WITH (24) 20A CIRCUITS, (18) 30A 3-WAY SWITCHES AND (40) 1POLE, 20A CIRCUIT BREAKERS. TOTAL CONNECTED LOAD: 14,300 WATTS

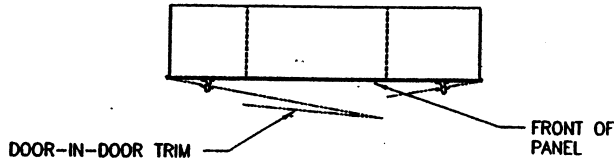
NORMAL-EMERGENCY LIGHTING PANEL
WIRING DIAGRAM AND SCHEDULE (TYPICAL)
 SCALE: NONE

NOTES:

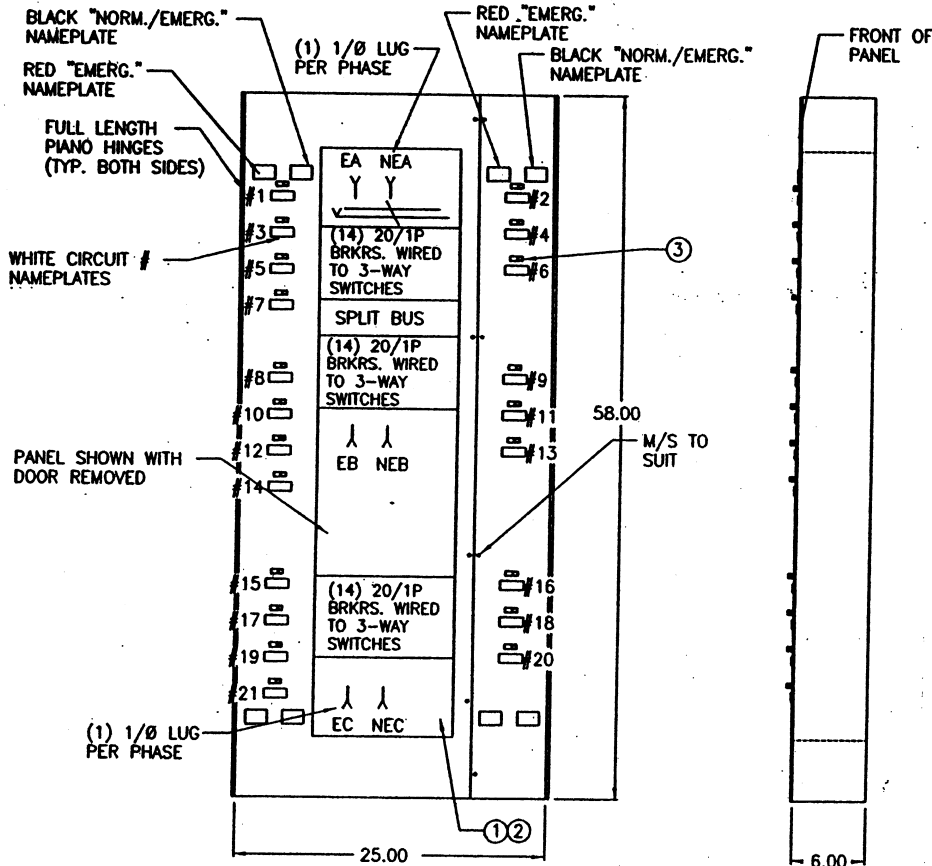
- 1) BOX CONSTRUCTION - NEMA 1 CONSTRUCTION OF CODE GA. HRPO SHEET STEEL
- 2) PAINT FINISH - ANSI #61 LIGHT GREY (INTERIORS & EXTERIORS)
- 3) ALL 3-WAY SWITCH WIRING TO BE #10 GA. S.I.S., UNLESS OTHERWISE NOTED.
- 4) PANEL - 208/120 V.; 3 PHASE; 4 WIRE; 100 A. (M.L.O.)

BILL OF MATERIAL

PC NO	QTY	MFG	DESCRIPTION
1	1	SIEMENS	100A, 208/120V, 3PH, 4W. PANEL
2	42	SIEMENS	MOLDED CASE CIRCUIT BREAKERS (20A/1P) - CAT. #B120
3	21	HUBBLE MFG.	30A. 3-WAY SWITCHES - CAT. #3033A
4	1	CORBIN	PANEL TRIM LOCK (NOT SHOWN)
5			



PLAN VIEW



FRONT VIEW

SIDE VIEW

NAMEPLATE DATA

- CIRCUIT #1 - EXIT LIGHTS
- CIRCUIT #2 - BASEMENT FLR. CORRIDOR LTS.
- CIRCUIT #3 - EXTERIOR DOOR LIGHTS
- CIRCUIT #4 - 1ST FLR. CORRIDOR LIGHTS
- CIRCUIT #5 - CAFETERIA LIGHTS
- CIRCUIT #6 - 2ND FLR. CORRIDOR LIGHTS
- CIRCUIT #7 - GYM LIGHTS
- CIRCUIT #8 - 3RD FLR. CORRIDOR LIGHTS
- CIRCUIT #9 - AUDITORIUM LIGHTS
- CIRCUIT #10 - SPARE
- CIRCUIT #11 - FIRE ALARM CONTROL PANEL
- CIRCUIT #12 - STAIR #1 LIGHTS
- CIRCUIT #13 - BOILER ROOM LIGHTS
- CIRCUIT #14 - STAIR #2 LIGHTS
- CIRCUIT #15 - ELECTR. & VAULT ROOM LIGHTS
- CIRCUIT #16 - STAIR #3 LIGHTS
- CIRCUIT #17 - STAIR #4 LIGHTS
- CIRCUIT #18 - BATTERY CHARGER
- CIRCUIT #19 - SPARE
- CIRCUIT #20 - SPARE
- CIRCUIT #21 - SPARE

NORMAL-EMERGENCY LIGHTING PANEL ENCLOSURE DESIGN (TYPICAL)

SCALE: NONE

ELECTRIC TRACTION ELEVATORS (Division 14)**Design Criteria**

- Provide at least one elevator for any project that is more than one story high, including basement.
- Provide one service elevator that will also be used by passengers.
- Design pits to be largest requirements of competing manufacturers.
- Design a depression in pit, 18" X 18" X 18", to accommodate sump pump.
- Hard piped drain or sump pump tied into building sanitary required as per new codes.
- Design all cab sizes to be nominal 5' X 8' for new construction.
- Design cab finish as plastic laminate.
- Design and specify electric traction elevators, operating at 250 fpm, in buildings over three stories.
- Design operating and emergency features in accordance with code requirements and consultation with manufacturer. Consult with SDOP about any special operating requirements.
- Design positive smoke evacuation for all shafts and equipment rooms.
- Specify low-wattage lighting in elevator cab.

Technical Standards

- Specify pad hooks in service elevators.
- Specify door and frame finish as painted steel.
- Specify doors as bi-parting.

- Specify controls and other features, to be accessible in accordance with ADA regulations.
- Specify reduced voltage starters for electric motors.
- Specify high efficiency motors.
- Elevators to be manufactured within 300 miles of project.
- Adhesives to have no urea formaldehyde.

Preferred Products

Thyssen Krupp Elevator

HYDRAULIC ELEVATORS (Division 14)**Design Criteria**

- Provide at least one elevator for any project that is more than one story high, including basement.
- Provide one service elevator that will also be used by passengers.
- Design pits to be largest requirements of competing manufacturers.
- Design a depression in pit, 18" X 18" X 18", to accommodate sump pump.
- Hard piped drain or sump pump tied into building sanitary required as per new codes.
- Design and specify a sump pump in every elevator pit.
- Oil separator required as per new codes.
- Design all cab sizes to be nominal 5' X 8' for new construction.
- Design cab finish as plastic laminate.
- Design positive smoke evacuation for all shafts and equipment rooms.
- Specify low-wattage lighting in elevator cab.

Technical Standards

- Specify pad hooks in service elevators.
- Specify door and frame finish as painted steel.
- Specify doors as bi-parting.
- Specify controls and other features, to be accessible in accordance with ADA regulations.

- Design and specify hydraulic elevators, operating at 80 fpm, in buildings up to three stories high, including basement, (3 stops).
- Specify reduced voltage starters for electric motors.
- Specify operating and emergency features in accordance with code requirements and consultation with manufacturer. Consult with SDOP about any special operating requirements.
- Car and carrying component to be made from recycled steel.
- Elevators to be manufactured within 300 miles of project.
- Adhesives to have no urea formaldehyde.

Preferred Products

Thyssen Krupp Elevator

D2000 Design Approach

1. Incoming Water Service

Design shall incorporate a backflow preventer and constant pressure pump system on incoming service type as indicated in School District Standards. Provide full size bypass around constant pressure pump. Attempt shall be made to combine services in building utilizing multiple existing services.

2. Space Requirements

- a. **K and pre-K classrooms:** Shall be provided with a single, unisex toilet room with classroom mounted sink and drinking fountain. Provide floor drain in toilet room.
- b. **Handicapped, special needs classrooms:** Shall be provided with handicapped unisex toilet room and classroom sink and drinking fountain. Provide floor drain in toilet room. Due to hygienic concerns bubblers are not to be incorporated with sinks.
- c. **Science rooms:** Sinks are to be provided with casework. Combination deluge shower/eye wash shall be provided where required by code. Provide floor drain at each installation. New construction shall utilize a retractable assembly flush mounted as indicated in the design standards. Renovation work where installation of retractable flush mount system is not possible shall use surface mounted equipment as indicated in the design standards.
- d. **Cafeteria:** Hand wash sinks shall be provided in both the public (serving area) and kitchen areas.
- e. **Kitchen:** Plumbing requirements for kitchen areas shall be developed through the Food Services Division of the School District. Hand wash sinks shall be provided in both the public (serving area) and kitchen areas. A unisex toilet shall be provided for cafeteria staff. Provide floor drain in toilet room.
- f. **Nurse's Office:** Single use unisex toilet and lavatory mounted in office shall be provided. Both faucets shall be handicapped type. Provide floor drain in toilet room.
- g. **Principal's Office:** Shall be provided with a single unisex toilet and floor drain.

- h. **Toilet Rooms:** Boys, Girls, Male and Female (staff) toilet rooms are to be provided on each floor. Provide floor drains in toilet rooms. Total fixture count shall be in accordance with the Philadelphia Plumbing Code. Total fixture count shall not include toilets in nurse's office, kindergarten rooms, and special needs classrooms.
- i. **Art Rooms:** Shall be provided with floor mounted scrub sink indicated in design standards and furnished with plaster trap.
- j. **Drinking Fountains:** Shall be placed in readily accessible areas and stacked vertically to minimize venting/drain requirements. All drinking fountains shall be dual height EWC's (in accordance with the ADA). Provided EWC for staff use in the main office. Due to hygienic concerns bubblers are not to be incorporated with sinks at any locations.
- k. **Janitor's Office:** Provide single unisex toilet and shower.
- l. **Mechanical Rooms:** Provide hand sink in large mechanical room. Provide floor drains in all mechanical rooms adjacent to air handling devices, pumps, and boilers. Do not provide floor drains in areas where fuel spillage may occur.
- m. **Exterior:** Wall hydrants shall be installed on each corner of the building and provided at the dumpster location.

3. Installation

- a. Wherever possible, all toilet rooms are to be provided with thirty inches (30") wide service chases to permit servicing. Supply piping shall be arranged along each wall and not to cross the chase. For new and existing service chases below thirty inches (30") provide with the necessary access panels to service flush-o-meters and other equipment. Panel and wall flange are by Sloan constructed of twelve gauge 316 stainless steel. The panel is approximately 17"(h) x 13"(w). It is provided with six flush tamper-proof fasteners which attach the faceplate to the wall flange. No hinge is to be provided. Sloan part number is HYWB-1713.
- b. Provide isolation valves to individually isolate each toilet room utilize ball valves only.
- c. Existing and new piping provided with insulation in exposed areas shall be furnished with stainless pipe jacketing to an elevation of 8'-0" AFF.
- d. All fixture carriers are to be indicated in fixture schedule.

- e. Plaster traps shall be installed in art, science rooms and other area where introduction of solid material is possible.
- f. Housekeeping pads will be provided for all equipment including, but not limited to, circulators, backflow preventers, constant pressure pump sets.
- g. Provide additional make-up line with shutoff to boiler feed before constant pressure pump inlet.
- h. All water meters are to be equipped with a bypass per Philadelphia Water Department
- i. Include within the contract documents the clearing of all drain lines during (existing construction) and prior to the completion of the project. All main drains are to be flushed and cleared at the conclusion of each project phase prior to turn over to owner. Any drain not to be found free running shall be the responsibility of the contractor. Add provision for twenty-four (24) hours of drain cleaning service including machine and operator.
- j. It is the District's desire to eliminate drop ceilings in toilet rooms to increase maintenance access and permit visual piping inspections. All areas with existing lay-in ceilings are to be reviewed to determine if the lay-in ceiling can be eliminated. The basis for reinstallation of a drop ceiling is if the existing ceiling is deemed unattractive, i.e., numerous conduits, piping, communication wiring, existing tin ceiling, or penetration that can not be effectively patched, etc. If a determination can not be made during design ceiling type will be finalized during the Constructability Walk-thru.

4. Applicable Codes

- a. Philadelphia Plumbing Code
- b. Philadelphia Cross Connection Code
- c. Philadelphia Gas Works Piping Specifications and Equipment Installations Manual
- d. IBC
- e. ASTM
- f. UL
- g. NFPA
- h. NSF

4. Restrictions

- a. No electronic water flow control devices for any application are acceptable.
 - b. ADA wrist blades are ONLY permitted on handicapped fixtures (except where indicated).
 - c. The District does not permit electric water cooler (EWC) or bubblers in auditoriums, gymnasiums and IMC's. EWC's are not permitted in areas adjacent to gym and entrances from play areas. No exterior drinking fountains are permitted. Centralized water chillers are not acceptable.
 - d. The District does not permit central water chillers
 - e. Filtration devices of any kind (excluding strainers) are not permitted.
 - f. Specifications shall indicate all water conveying devices are to be "Certified in accordance with ANSI/NSF 61 Section 9 - 1997b and California Proposition 65.
 - g. All drinking water outlets or sink fixtures (other than bathrooms) must be officially removed from the drinking water program and receive official written approval from the Department of Health prior to replacement.
 - h. The use of T-drill, T-drill II, Rigid pipe clamp system or other devices to fasten piping is prohibited.
5. Warranties all equipment shall be provided with a one year warranty from the period of owner's acceptance except where indicated in the standards.
 6. Priorities the average District school building is approximate sixty-two years old. The longevity of building systems is a high priority. Equipment should be selected based on durability and minimal maintenance requirements. All routine maintenance items should be designed for easy access requiring no or limited use of ladders. Designers are to prioritize designs based on:
 - a. Equipment longevity
 - b. Maintainability
 - c. Energy efficiency
 - d. First cost.

PHILADELPHIA PUBLIC SCHOOL

STANDARDS FOR URINALS, WATER CLOSETS, LAVATORIES, DRINKING FOUNTAINS, STALL SHOWERS AND GANG SHOWERS MEASUREMENTS FROM FLOOR TO RIM

SCHOOL TYPE	URINAL*	WATER CLOSET	LAVATORIES	WATER FOUNTAIN	STALL SHOWER	GANG SHOWER
ELEMENTARY/ KINDERGARTEN	NOT USED	PRE-K 13" STANDARD 14"	24"	24"	BOYS 48" GIRLS 48"	BOYS 48" GIRLS 48"
GROUND/ FIRST FLOOR	1/3 • 17" 2/3 • 20"	1/3 • 13" 2/3 • 15"	27"	24"	BOYS 48" GIRLS 48"	BOYS 48" GIRLS 48"
SECOND FLOOR	20"	13"	28"	26"	BOYS 48" GIRLS 48"	BOYS 48" GIRLS 48"
THIRD FLOOR AND ABOVE	20"	15"	31"	30"	BOYS 48" GIRLS 48"	BOYS 48" GIRLS 48"
JUNIOR HIGH ALL FLOORS	22"	15"	31"	34"	BOYS 60" GIRLS 54"	BOYS 60" GIRLS 54"
SENIOR HIGH/ JUNIOR-SENIOR ALL FLOORS	24"	15"	31"	36"	BOYS 72" GIRLS 56"	BOYS 72" GIRLS 56"
YARDS ELEMENTARY/ JUNIOR/SENIOR	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	NOT PERMITTED	NOT APPLICABLE	NOT APPLICABLE

ALL INSTALLATIONS SHALL MEET APPLICABLE ADA/HANDICAP REQUIREMENTS
 *URINALS TO BE SPACED NOT LESS THEN 2'-2" ON CENTER

STALLS TO BE SPACED NOT LESS THEN:

GIRLS: 2'-6" x 4'-6"

BOYS: 2'-6" x 4'-0"

STALL PARTITION TO BE INSTALLED 1'-0" ABOVE FINISHED FLOOR
 AND TERMINATE 5'-10" ABOVE FLOOR

THIS CHART IS TO BE USED AS A GUIDE. THE VARIOUS COMBINATIONS
 OF INSTALLATIONS WILL REQUIRE THE USE OF GOOD JUDGMENT.



SCHOOL NAME
PROJECT TITLE MECHANICAL CONTRACT
DRAWING TITLE FIXTURE MOUNTING HEIGHT

**SCHOOL DISTRICT OF PHILADELPHIA
THE BOARD OF EDUCATION**

DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES

JOHN F. KENNEDY CENTER
734 SCHUYLKILL AVENUE
PHILADELPHIA, PA 19146-2397
(215) 875-3950 FAX (215) 875-5791

SPEC NO. N/A
SCALE NONE
DATE 08/06/03

DRAWING NO. FMH01

D 20 PLUMBING

LIST ALL APPLICABLE CODES ON DESIGN DOCUMENTS INCLUDING IBC, PHILADELPHIA PLUMBING CODE, THE PHILADELPHIA CROSS CONNECTION CODE AND THE PHILADELPHIA GAS WORKS PIPING SPECIFICATIONS AND EQUIPMENT INSTALLATIONS MANUAL. INDICATE THAT LOCAL CODES SUPERSEDE THE IBC CODE WHERE CONFLICTS OCCUR.

D2010 Plumbing Fixtures 15410 PLUMBING FIXTURES**D2010.1 Water Closets**

1. Acceptable manufacturers: American Standard Afwall, Kohler, Crane
2. Description: 1.6 gpf , white vitreous china, flush valve type, elongated bowl, wall mounted, siphon jet
3. Installation: All fixtures to be installed on floor mounted carrier.
Elevation as indicated on the District fixture standards drawing FMH01.
4. Accessories:
 - a. Seat color black, open front, manufacturers Olsonite or Church
 - b. Flush-o-meter (see below)
 - c. Carrier – provide stainless steel studs and fasteners
5. Additional Notes: Include steel uprights with feet for fixture carrier with hanger and bearing plates. Floor mounted fixtures maybe permitted in applications involving limited replacement of similar type when approved. “Baby Davro” type toilet fixtures are not permitted.

D2010.2 Urinals

1. Acceptable manufacturers: American Standard “Washbrook”, Kohler, Crane
2. Description: 1.0 gpf, white vitreous china, wall mount, extended sides
3. Installation: All fixtures to be installed on floor mounted carriers.
Elevation as indicated on the District fixture standards drawing FMH01.
4. Accessories:
 - a. Stainless Steel Strainer 047068-0070A (removable bee-hive type strainer threaded to fixed base flange)
 - b. Flush-o-meter (see below)

5. Additional Notes: Include steel uprights with feet for urinal carrier with hanger and bearing plates. No floor mounted urinals or waterless urinals are permitted.

D2010.3 Lavatories

1. Acceptable manufacturers: Kohler “Hudson”, Eljer Bucknell and CECO
2. Description: Wall mounted 19”x 17”, white enameled cast iron with 4” centers for faucets and integral backsplash.
3. Installation: All fixtures to be installed on floor mounted carriers. Elevation as indicated on the District fixture standards drawing FMH01.
 - a. Public Toilets Room Faucets - shall be spring loaded self closing type, no metering type faucets.
 - b. Non-Public (Faculty) Toilets Room Faucets - shall be manual
4. Faucets:
 - a. Public - faucet Delta 23T deck mount single bib and “B-LT” stream regulator (aerators not permitted) self-closing spring loaded with cross type handle
 - b. Non-Public - faucet Delta 23T deck mount single bib and “B-LT” stream regulator (aerators not permitted) manual closing with cross type handle
 - c. Handicapped - faucet Delta 23T deck mount single bib and “B-LT” stream regulator (aerators not permitted) manual closing with wrist-blade handles for ADA applications.
5. Accessories:
 - a. Key operated quarter turn stop valves shall be “Brasscraft” no acceptations provide with separate key operator.
6. Additional Notes:
 - a. No plastic caps are permitted on faucets use only vandal-proof stainless steel.
 - b. Carrier shall include steel uprights with feet and bearing plates.
 - c. Vitreous china fixtures are NOT permitted.
 - d. Metering faucets are NOT permitted.

- e. Screened faucet aerators are NOT permitted, use laminar flow or jetting outlet.
- f. Faucet shall be certified in accordance with ANSI/NSF 61 Section 9 - 1997b and California Proposition 65.

D2010.4a Classroom Sinks (drop-in type)

1. Acceptable manufacturers: Elkay Lustertone LR1517, Eljer, Just
2. Description: 18 gage 304 stainless steel Stainless steel drop-in sink with 4" centers for faucets. Dimensions 15" x 17.5" x 7.5"
3. Installation: Elevation as indicated on the District fixture standards drawing FMH01.
4. Faucets:
 - a. Delta 23T deck mount single bib and "B-LT" stream regulator (aerators not permitted) manual closing with wrist-blade handles.
5. Accessories:
 - a. Key operated quarter turn stop valves shall be "Brasscraft" no acceptations provide with separate key operator.
6. Additional Notes:
 - a. No plastic caps are permitted on faucets use only vandal-proof stainless steel.
 - b. Screened faucet aerators are NOT permitted, use laminar flow or jetting outlet.
 - c. Faucet shall be certified in accordance with ANSI/NSF 61 Section 9 - 1997b and California Proposition 65.

D2010.4b Service Sinks (Art Room Sinks)

1. Acceptable manufacturers: Elkay Weldbilt WNSF-8124, Eljer, Just
2. Description: 14 gauge 304 stainless steel, floor mounted freestanding "Scullery Style" sink with legs and unit mounted faucet in integral backsplash. Dimensions bowl 24" x 24" , rim height 36"
3. Installation: For use in art and craft rooms

4. Faucets:
 - a. Faucet LK 69-C double handle manual type with 4" wrist blade handles for ADA compliance.
5. Accessories:
 - a. Plaster Trap
 - b. Key operated quarter turn stop valves shall be "Brasscraft" no acceptations provide with separate key operator.
6. Additional Notes: No bubblers are permitted on sinks. No vitreous china fixtures are permitted. No metering faucets are permitted. No screened faucet aerators are permitted, use laminar flow or jetting outlet. Faucet shall be certified in accordance with ANSI/NSF 61 Section 9 - 1997b and California Proposition 65.

D2010.5 Showers Basins

1. Acceptable manufacturers: Fiat ADAW-3636 or pre-approved equal.
2. Description: One piece precast Terrazzo ADA compliant shower base.
3. Installation: install per requirements of the Accessibility Guidelines, Section 4.20 Bathtubs, of the Act. Provide 5'-0" high tiled three side enclosure with curtain.
4. Accessories:
 - a. Powers e710K10000 metal mixing valve and showerhead.
5. Additional Notes: Shower assembly shall be certified in accordance with ANSI/NSF 61 Section 9 - 1997b and California Proposition 65. Prefabricated tub surrounds will not be permitted.

D2010.6 Bathtubs

1. Acceptable manufacturers: Kohler "Villager" 715-6, or pre-approved equal.
2. Description: White enameled cast iron.
3. Installation: Install per requirements of the Accessibility Guidelines, Section 4.20 Bathtubs, of the Act. Provide 5'-0" high tiled three side enclosure with curtain.

4. Accessories:
 - a. Powers e710J1S000 metal mixing valve and showerhead.
 - b. ADA compliant seat
5. Additional Notes: Shower assembly shall be certified in accordance with ANSI/NSF 61 Section 9 - 1997b and California Proposition 65. Prefabricated tub surrounds will not be permitted.

D2010.7 Mop Receptors

1. Acceptable manufacturers: Fiat MSB 2424, or MSB 3624, or pre-approved equal
2. Description: Single piece molded stone mop service basin. Walls shall be 10" high and not less than 1" thick. Drain shall be stainless steel with dome strainer and lint basket sized for 3" inch drain connection.
3. Installation: Select largest model listed to accommodate installation.
4. Accessories:
 - a. Service faucet Delta 20189
 - b. Hose
 - c. Hose Bracket
 - d. Wall mounted mop hanger Fiat 889-CC
5. Additional Notes:

D2010.8 Flush-O-Meters

1. Acceptable manufacturers: Sloan Regal or pre-approved equal
2. Description:
 - a. Series 111-1.6 exposed applications - chrome plated, ADA compliant handle operator, and vandal resistant stop cap. Valve body, cover, tailpiece and control stop shall be in conformance with ASTM alloy classification for semi-red brass.
 - b. Series 950-1.6 concealed applications – hydraulic
 - c. Water Closets - 1.6 gallon, chrome plated, ADA compliant button operator. Valve body, cover, tailpiece and control stop shall be in conformance with ASTM alloy classification for semi-red brass.

3. Installation: Pre-K through 9th grade shall utilize exposed flush-o-meter. Grades 10th through 12th shall use concealed flush-o-meter.
4. Accessories:
 - a. Concealed application Stainless steel button and escutcheon (part number HY-100-A). Where chase space is less than twenty-four inches provide WB1B 12 gauge 316 stainless steel 12"x18" access panel at each flush-o-meter.
5. Additional Notes:

D2010.9a Wall Hydrants (exterior)

1. Acceptable manufacturers: Josam 71000, Watts, Wade
2. Description: cast bronze box type non-freeze wall Hydrant with hex key operated hinged latching cover and 3/4" H.P.T. outlet with key operator, integral vacuum breaker-backflow preventer, pressure relief valve, bronze casing, bronze operating parts convertible into service tool, 3/4" female and 1" male N.P.T. inlet connections.
3. Installation: Provide minimum one on each exposure and one additional at dumpster for wash-down.
4. Accessories: Wall clamp
5. Additional Notes: Designer shall review with Architect for additional locations.

D2010.9b Wall Hydrants (interior)

1. Acceptable manufacturers: Josam 71020, Watts, Wade
2. Description: Cast bronze box type mild climate wall Hydrant with hex key operated hinged latching cover and 3/4" H.P.T. outlet with key operator, integral vacuum breaker-backflow preventer, pressure relief valve, bronze casing, bronze operating parts convertible into service tool, 3/4" female and 1" male N.P.T. inlet connections.
3. Installation: Provide in all public areas requiring a hose bib.
4. Accessories: Wall clamp
5. Additional Notes: Designer shall review with Architect for additional

locations.

D2010.10 Floor Drains

1. Acceptable manufacturers: Josam 30000-A, Smith, Zurn
2. Description: Coated cast iron, two-piece body with double drainage flange, WEJLOC invertible non-puncturing flashing collar, weepholes, bottom outlet and adjustable satin Nikaloy round SUPER-FLO strainer.
3. Installation: Acceptable in all interior public areas excluding kitchens.
4. Accessories: Satin bronze finish, secured grate with vandal-proof screws, perforated stainless steel basket
5. Additional Notes: Designer shall review with Architect for additional locations.
6. Design Standard Web product page: <http://www.josam.com>

D2010.11 Drinking Fountains 15415 DRINKING FOUNTAINS AND WATER COOLERS

D2010.11a Drinking Fountains (Electric Water Coolers)

1. Acceptable manufacturers: Halsey Taylor HVR8BL-ADA, Oasis, Sunrock
2. Description: Self-contained bi-level wall mounted ADA compliant electric water cooler. All exposed surfaces shall be stainless steel construction. Bubbler head shall be one piece stainless steel vandal resistance type. Activator shall be vandal-proof push-button type (push-bars are unacceptable).
3. Installation: Provide necessary blocking for hanger bracket in accordance with manufacturers installation instructions. Install cooler so that lower units is in compliance with ADA guidelines.
4. Accessories:
5. Additional Notes: Electric water coolers are not permitted at the basement level or outside gymnasiums, bubblers only. Installation of exterior fountains is prohibited. Coordinate installation with architect to allow recessing on drinking fountains where required. Use of remote coolers is prohibited. Fountains shall be certified in accordance with

ANSI/NSF 61 Section 9-1997b and California Proposition 65.

D2010.11b Drinking Fountains (non-electrified Bubblers)

1. Acceptable manufacturers: Halsey Taylor HDFBLEBP, Oasis, Sunrock
2. Description: Bi-level wall mounted ADA compliant non-electrified bubbler. All exposed surfaces shall be stainless steel construction. Bubbler head shall be one piece stainless steel vandal resistance type. Activator shall be vandal-proof push-button type (push-bars are unacceptable).
3. Installation: Provide necessary blocking for hanger bracket in accordance with manufacturers installation instructions. Install bubbler so that a lower unit is in compliance with ADA guidelines.
4. Accessories:
5. Additional Notes: Non-electrified bubblers are to be used at the basement level outside gymnasiums, and high abuse areas. Installation of exterior fountains is prohibited. Coordinate installation with architect to allow recessing on drinking fountains where required. Fountains shall be certified in accordance with ANSI/NSF 61 Section 9-1997b and California Proposition 65.

D2010.12 Science Room Emergency Fixtures

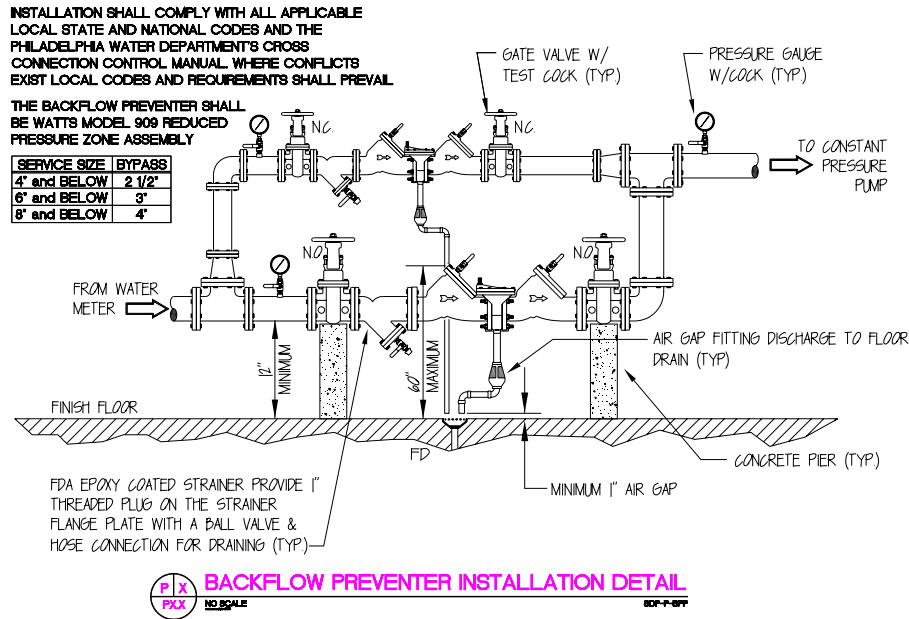
1. Acceptable manufacturers: Guardian, Speakman, Bradley
2. Description:
 - b. Emergency Eye Wash
 - 1.) Guardian Model GBFVR1721 vandal resistant (existing construction)
 - 2.) Guardian Recessed Model G1813 (new construction)
 - c. Emergency Shower
 - 1.) Guardian Model GBFVR1721 vandal resistant (existing construction)
 - 2.) Guardian Model GBF1672 (new construction) furnish with AP28D-230 electric light and alarm horn
 - d. Emergency Shower/Eye Wash
 - 1.) Guardian Model GBF2150 (new construction) furnish with AP28D-230 electric light and alarm horn

3. Installation: Provide accessible isolation valve at ceiling for each installation. Install equipment in accordance with manufacturers requirements and to compliance with ADA guidelines.
4. Accessories:
5. Additional Notes:

D2020 Domestic Water Distribution 15410

D2020.1a Back flow Preventers

1. Acceptable manufacturers: Watts 909 for all horizontal applications no exceptions
2. Description: cast bronze box type mild climate wall Hydrant with satin Nikaloy scoriated hinged latching cover, 3/4" H.P.T. outlet, integral vacuum breaker-backflow preventer, pressure relief valve, bronze casing, bronze operating parts convertible into service tool, 3/4" female and 1" male N.P.T. inlet connections.
3. Installation: Provide full size backflow preventer on incoming water service with auxiliary line and backflow sized according to table below. Main backflow preventer shall be piped to dedicated floor drain. All mechanical equipment feeds shall be protected with backflow preventers where building systems can be compromised. ALL backflow preventers shall be mounted no higher than 60" AFF
4. Accessories: Watts air gap assembly
5. Additional Notes:
 - a. Installation shall comply with Philadelphia Cross Connection Control Manual
 - b. New construction installations shall utilize horizontal backflow preventers only.
 - c. All backflow preventers shall be install no greater than 60" above finished floor
 - d. Designer shall provide sufficient clearance for servicing.

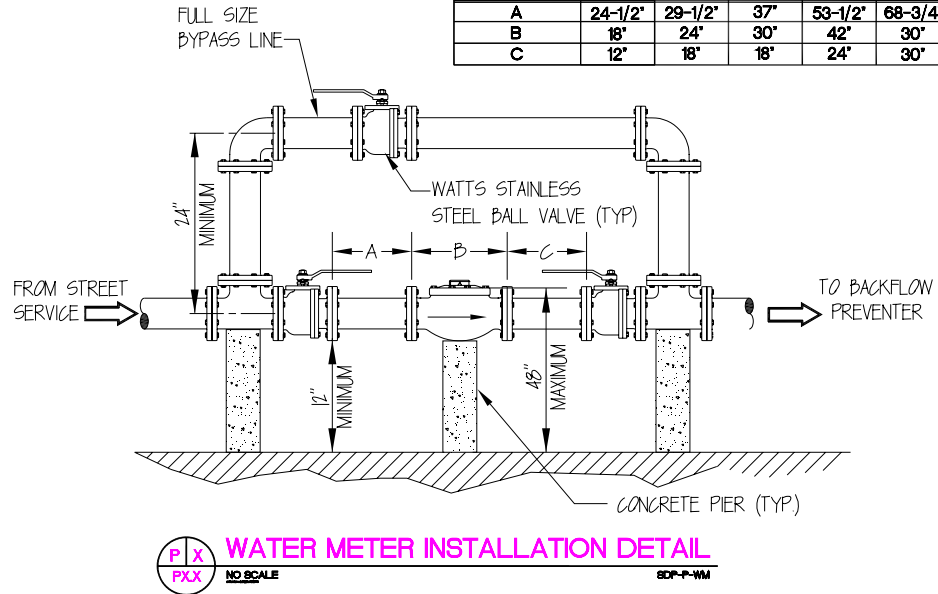


D2020.1b Water Meters

1. Water meter shall be furnished by the Philadelphia Water Department (PWD)
2. Installation: Provide full size bypass at meter location. Utilize Watts stainless steel ball valves for isolation and bypass.
3. Accessories: Provide adjust metal pipe supports to permit meter set removal and reinstallation with undue stress on adjacent piping. Minimum two required at meter location.
4. Additional Notes:
 - a. Installation shall comply with Philadelphia Cross Connection Control Manual
 - b. Designer shall provide sufficient clearance for servicing and as indicated in Philadelphia Cross Connection Control Manual

INSTALLATION SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND NATIONAL CODES AND THE PHILADELPHIA WATER DEPARTMENT'S CROSS CONNECTION CONTROL MANUAL. WHERE CONFLICTS EXIST LOCAL CODES AND REQUIREMENTS SHALL PREVAIL

DIMENSION	PIPE SIZE				
	3"	4"	6"	8"	10"
A	24-1/2"	29-1/2"	37"	53-1/2"	68-3/4"
B	18"	24"	30"	42"	30"
C	12"	18"	18"	24"	30"



D2010.2 PUMPS

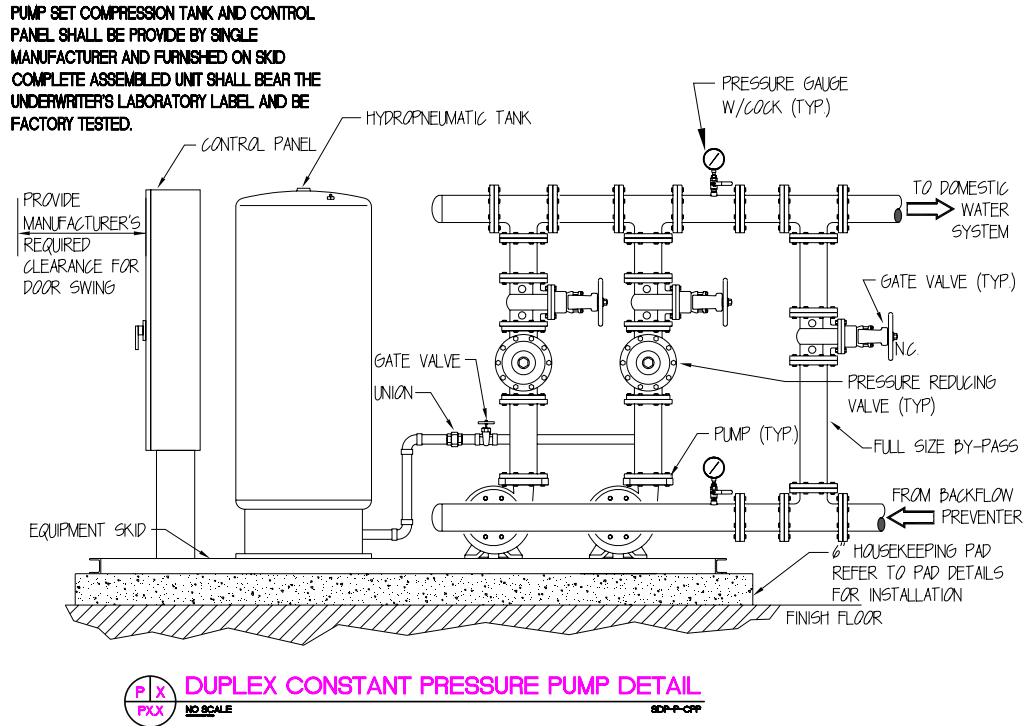
Constant Pressure Pump

15444 PACKAGED BOOSTER

1. Acceptable manufacturers: Armstrong Pump Inc., Bell & Gossett, or Aurora Pump Co.
2. Description: System shall include two (2) pumps. Each pump shall be installed to allow individual pumps to be serviced while the booster pump system is in operation. Provide 130 gallon ASME rated bladder type expansion tank. A common steel base shall be used for system. A common steel base shall be provided for the system. System shall include a control panel in a NEMA 1 enclosure. Panel shall include externally operable main disconnect, individual motor circuit breakers, control power transformer, door interlock, H-O-A, magnetic starters with three (3) leg overload protection, externally operable reset buttons and pilot lights. The control panel shall also include power on light, minimum run timers for each pump, lead pump failure protection, audible alarm package, and an automatic alternator. Provide high suction pressure shutoff, and low suction pressure shutoff. System shall be furnished factory wired.
3. Installation: Install pump set on housekeeping pad. Provide full size bypass around constant pressure pump system. Provide one (1) complete

pump seal kit to Owner. Provide the services of a manufacturer's representative for not less than one eight (8) hour workday on site for installation inspection, startup and instructing the Owner's operating personnel.

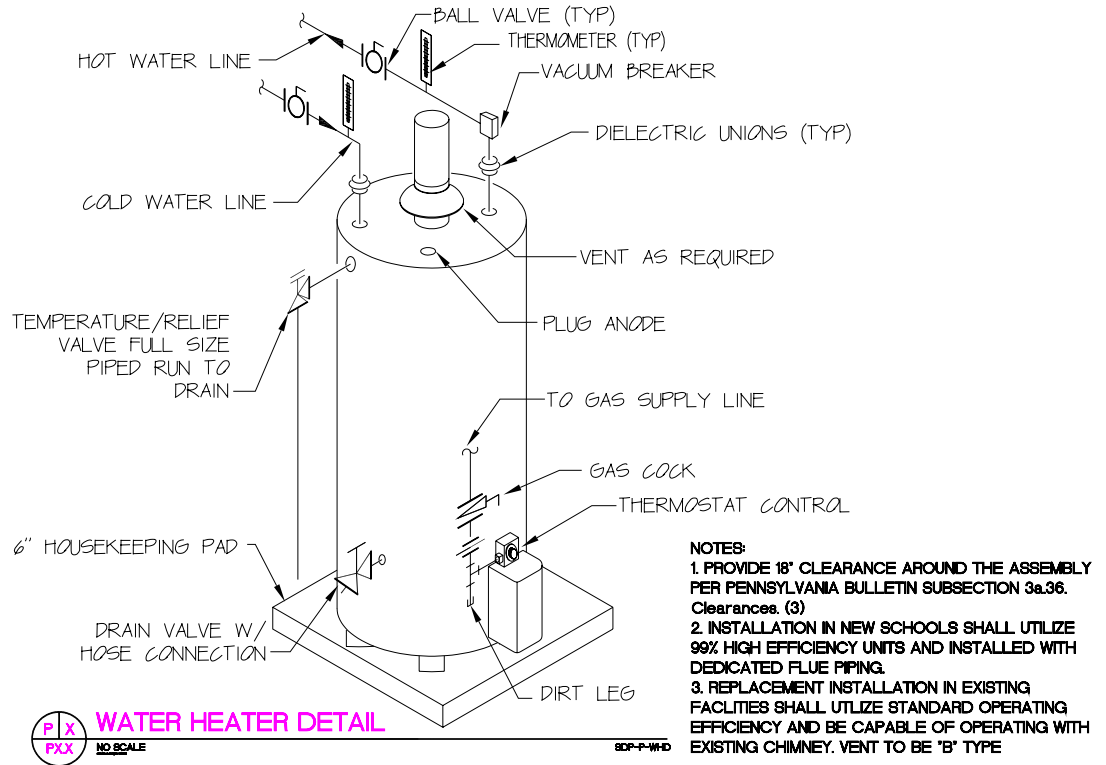
4. Accessories:
5. Additional Notes: Designer shall provide sufficient clearance for servicing.



D2010.3 Domestic Water Heaters 15486 FUEL-FIRED, DOMESTIC WATER HEATERS

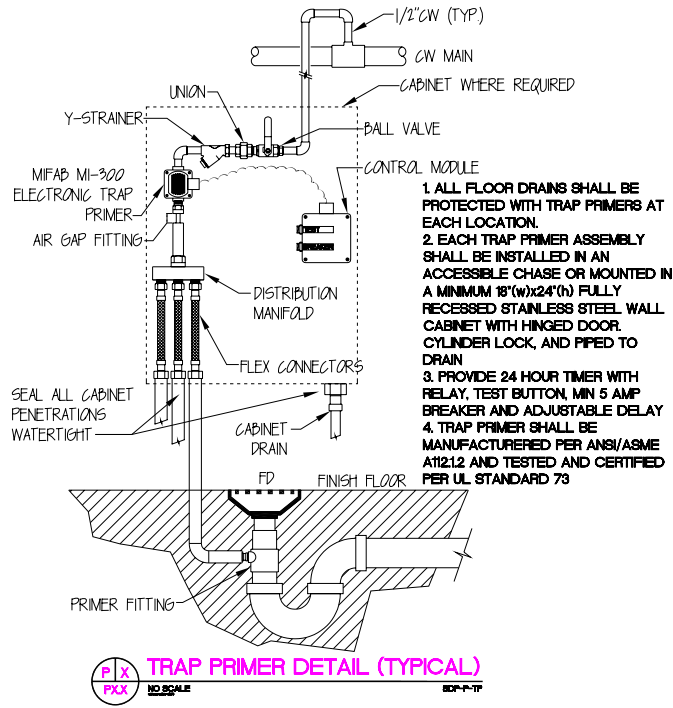
1. Acceptable manufacturers: Bradford-White, A.O Smith, or State.
2. Description: Floor -mounted tank type 99% efficiency water heaters.
3. Installation: Maintain minimum clearance requirements per Pennsylvania Labor and Industry code requirements
4. Accessories:
5. Additional Notes:

- a. Provide two heating units each sized at 50% capacity. Boiler insert heaters are not permitted. Instantaneous heater not permitted.
- b. Existing construction and/or replacement shall utilize 80% efficiency heaters

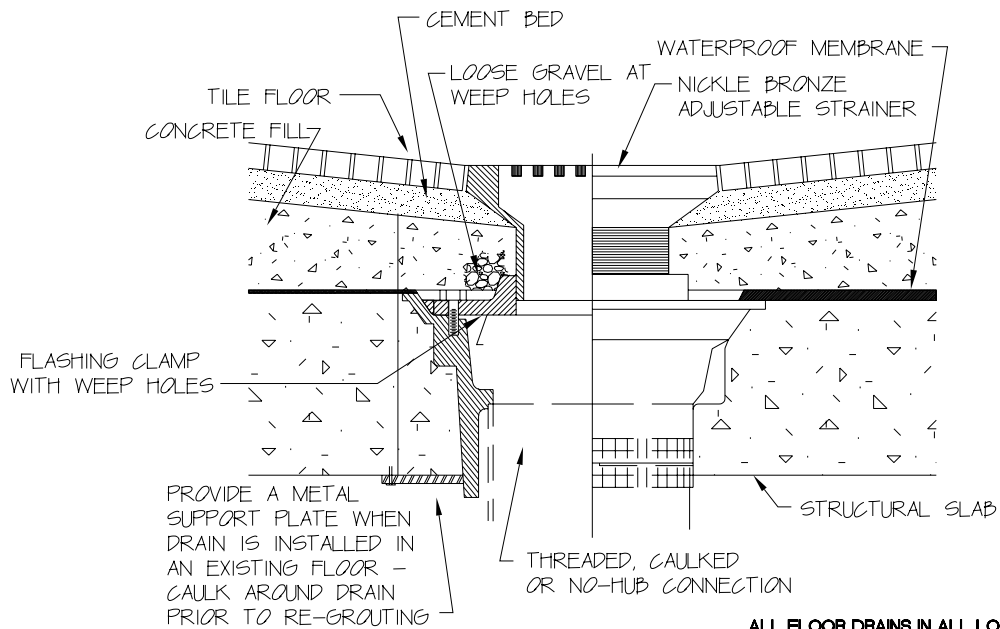


D2010.4 Trap Primers

1. Acceptable manufacturers: Mifab, Precision Piping Products, or Prime.
2. Description: Primer shall be manufactured per ANSI/ASME A112.12 tested and certified per U.L. standard 73.
3. Installation: Provide trap primers to service all floor drains. Locate primer manifold and controls in an accessible chase or mount in a minimum 18" w x 24" h fully recessed stainless steel wall cabinet with drainage piping.
4. Accessories: Provide air gap fitting, 24 hour timer, relay, test button, breaker and adjustable delay.
5. Additional Notes: Refer to detail



TRAP PRIMER DETAIL (TYPICAL)



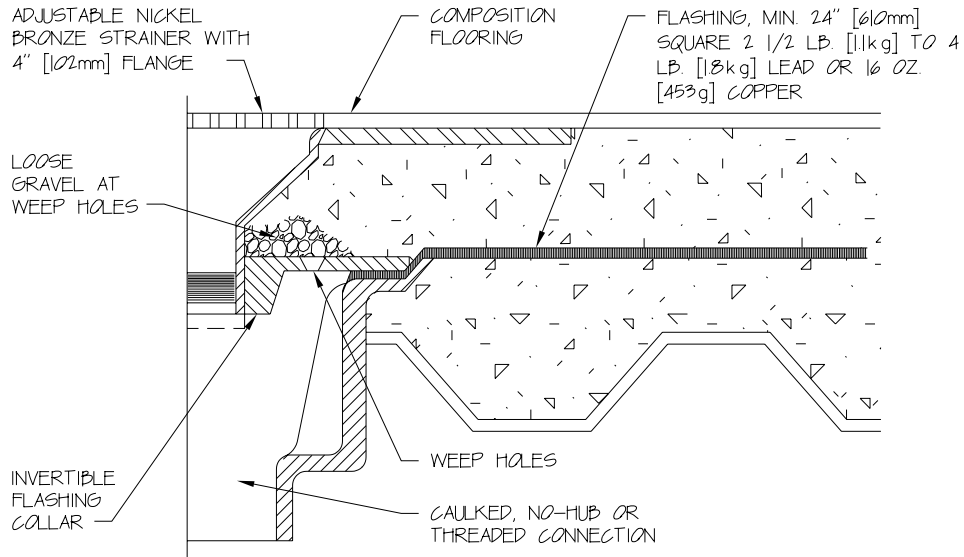
TYPE "C" FLOOR DRAIN DETAIL

ALL FLOOR DRAINS IN ALL LOCATIONS ARE TO BE PROVIDED WITH TRAP PRIMERS. LINE SERVICE SHALL BE MINIMUM 1/2" FOR EACH SINGLE CONNECTION. REFER TO TRAP PRIMER DETAIL SDP-P-TP FOR ADDITIONAL INFORMATION



NO SCALE

SDP-P-FD-C



NOTE: PROVIDE FLASHING WHEN DRAIN IS INSTALLED IN A NON MEMBRANE FLOOR

ALL FLOOR DRAINS IN ALL LOCATIONS ARE TO BE PROVIDED WITH TRAP PRIMERS. LINE SERVICE SHALL BE MINIMUM 1/2" FOR EACH SINGLE CONNECTION. REFER TO TRAP PRIMER DETAIL SDP-P-TP FOR ADDITIONAL INFORMATION

TYPE 'D' FLOOR DRAIN DETAIL
 NO SCALE SDP-P-FD-D

NUMBER	TITLE	MF NUMBER	EXPLANATION
D 30	HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)		
D3010	Energy Supply		
D3010.1	Oil Supply Systems	15191	FUEL OIL PIPING
D3010.1a	Underground Fuel Storage Tanks		
	<ol style="list-style-type: none"> 1. Acceptable manufacturers: Highland Tank or pre-approved equal 2. Description: Double wall steel tank with STI-P3[®] coating. Provide two manholes one fill and one level opening with bolted and gasket lids. Internal ladder with 2"X 1/4" flat bar sides and 3/4" diameter rungs 12" on center. Striker plates required under <u>each</u> opening. Polyurethane coating (15 mils DFT head and shell) per STI-P3[®] spec. The corrosion control system shall be in strict accordance with STI-P3[®] specifications as applied by a licensee of the STEEL TANK INSTITUTE and shall have the STI-P3[®] limited 30 year warranty against failure due to exterior corrosion and internal corrosion when used with petroleum products or alcohols. Tank shall bear UL and STI-P3[®] labels Manholes will have 42" dia. Cast-iron grade covers with vandal-proof fasteners. 3. Installation: An air test of the tank above ground is required. Pressure should not exceed 5 psi while a bubble solution is applied to welded seams. Refer to instructions on side of tank or per PEI RP100-94. Before placing the tank in the excavation, all dirt clods and similar foreign matter shall be cleaned from the tank, and areas of coating damage shall be repaired with a compatible coating supplied by the manufacturer. An air test of the tank above ground is required. Pressure should not exceed 5 psi while a bubble solution is applied to welded seams. Refer to instructions on side of tank or per PEI RP100-94. Under no circumstances use chains or slings around the tank shell. Special Note: Hold Down Straps--Special care should be exercised when installing hold down straps to ensure that the straps are separated from the tanks by separating pads made of an inert, insulation dielectric material. The separating pad should be at least 2" wider than the hold down straps width and must be carefully placed anywhere on the tank where hold down straps would come into direct contact with the tank shell Sizing of concrete pad beneath the tank shall be as recommended by the tank manufacturer. 		

D3010 Energy Supply

D3010.1 Oil Supply Systems 15191 FUEL OIL PIPING

D3010.1a Underground Fuel Storage Tanks

1. Acceptable manufacturers: Highland Tank or pre-approved equal
2. Description: Double wall steel tank with STI-P3[®] coating. Provide two manholes one fill and one level opening with bolted and gasket lids. Internal ladder with 2"X 1/4" flat bar sides and 3/4" diameter rungs 12" on center. Striker plates required under each opening. Polyurethane coating (15 mils DFT head and shell) per STI-P3[®] spec. The corrosion control system shall be in strict accordance with STI-P3[®] specifications as applied by a licensee of the STEEL TANK INSTITUTE and shall have the STI-P3[®] limited 30 year warranty against failure due to exterior corrosion and internal corrosion when used with petroleum products or alcohols. Tank shall bear UL and STI-P3[®] labels

Manholes will have 42" dia. Cast-iron grade covers with vandal-proof fasteners.

3. Installation: An air test of the tank above ground is required. Pressure should not exceed 5 psi while a bubble solution is applied to welded seams. Refer to instructions on side of tank or per PEI RP100-94. Before placing the tank in the excavation, all dirt clods and similar foreign matter shall be cleaned from the tank, and areas of coating damage shall be repaired with a compatible coating supplied by the manufacturer. An air test of the tank above ground is required. Pressure should not exceed 5 psi while a bubble solution is applied to welded seams. Refer to instructions on side of tank or per PEI RP100-94. Under no circumstances use chains or slings around the tank shell. Special Note: Hold Down Straps--Special care should be exercised when installing hold down straps to ensure that the straps are separated from the tanks by separating pads made of an inert, insulation dielectric material. The separating pad should be at least 2" wider than the hold down straps width and must be carefully placed anywhere on the tank where hold down straps would come into direct contact with the tank shell

Sizing of concrete pad beneath the tank shall be as recommended by the tank manufacturer.

4. Accessories:
 - a. Tank and piping leak monitoring detection unit.
 - b. Tank level meter with reporting feature to DDC for current level and alarm at field adjustable set point.
5. Additional Notes: Tank shall be sized for fourteen day capacity. Fiberglass and above ground storage tanks are not acceptable.

Tank will be sized based on fuel-oil required for operation of boilers to meet the full design load for 80 hours of occupied time plus to meet the 30% of design load for 256 hours of unoccupied time.
6. Design Standard Web product page: <http://www.highlandtank.com/>

D3010.2 Gas Supply Systems 15194 FUEL GAS PIPING

D3010.2a Gas Boosters

1. Acceptable manufacturers: Eclipse or pre-approved equal

Gas Booster shall be pre-wired, factory-tested, packaged type, skid mounted, and ready with field connections for gas piping and power supply.
2. Description:
3. Installation: Provide 6" housekeeping pads for equipment. Provide isolation valves for servicing.
4. Accessories: Furnish with cooler.

Requirement of cooler will be as recommended by the manufacturer.
5. Additional Notes: Review with PGW the existing gas pressure. In the event available gas pressure is questionable specify booster as deduct alternate with line item costs.
6. Design Standard Web product page:

D3010 Steam, Hot and Chiller Water Supply Systems

D3010.3

Pumps

15185 HYDRONIC PUMPS

1. Acceptable manufacturers: Bell & Gossett, Armstrong Pump Inc., or Taco Co.

MEPCO, Goulds Pumps and PACO Pumps are also acceptable manufacturers.

2. Description: In-line circulators, Vertical in-line pumps, End-suction pumps, Double-suction pumps. Units shall be factory assembled and tested.
 - a. Motors shall include built-in, thermal-overload protection and grease-lubricated ball bearings. Select each motor to be non-overloading over full range of pump performance curve. Motors shall be high efficiency type.
 - b. Casing - Cast iron, with threaded companion flanges for piping connections, and threaded gage tapping at inlet and outlet connections.
 - c. Impeller: ASTM B 584, cast bronze, statically and dynamically balanced, and keyed to shaft.
 - d. Shaft and Sleeve: Steel shaft with oil-lubricated copper sleeve.
 - e. Seals: Mechanical type. Include carbon-steel rotating ring, stainless-steel spring, ceramic seat, and flexible bellows and gasket.
 - f. Pump Bearings: Oil-lubricated, bronze journal and thrust type.
 - g. Coupling: Flexible, capable of absorbing torsional vibration and shaft misalignment.
3. Installation:
 - a. Install flexible connectors on suction and discharge sides of pump
 - b. Install single pressure gage on common manifold from pump suction and discharge.
 - c. Support pumps and piping separately so piping is not supported by pumps.
 - d. Provide suction diffuser and triple duty valve on each pump

e. Provide 6" housekeeping pads for equipment.

4. Accessories:

a. Suction Diffuser: Angle or straight pattern, 175-psig (1200-kPa) pressure rating, cast-iron body and end cap, pump-inlet fitting; with bronze startup and bronze or stainless-steel permanent strainers; bronze or stainless-steel straightening vanes; drain plug; and factory- or field-fabricated support.

b. Triple-Duty Valve: Angle or straight pattern, 175-psig (1200-kPa) pressure rating, cast-iron body, pump- discharge fitting; with drain plug and bronze-fitted shutoff, balancing, and check valve features

5. Electrical - Unit shall require single electrical connection. All wiring 120 volt and higher and wire size #8 and smaller shall be run in MC cable. All wire size #6 and larger shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box. Low voltage wiring shall use plenum cable, installed in conduit. Starter coils shall be 24 volt AC for contactors rated 75 amps or less and 120 volt AC for contactors rated greater than 75 amps.

All power and control wiring (in mechanical room) shall be in rigid steel conduits. Use liquid-tight flexible conduits up to 3-feet for connections at motor-terminals.

6. Additional Notes:

7. Design Standard Web product page: <http://www.bellgossett.com/>

D3010.4 Condensate Pumps 15186 STEAM CONDENSATE PUMPS

1. Acceptable manufacturers: **Domestic ITT Fluid Handling "CB Series"**, Federal Pump Corp. Spirax Sarco, Inc.

MEPCO, Shipco and Flotronics Pumps are also acceptable manufacturers.

2. Description: Factory-fabricated, packaged, electric-drive pump units; with receiver, pumps, controls, and accessories suitable for operation with low-pressure steam condensate.

a. Configuration: Duplex unit with receiver and float switch.

b. Receiver: Floor-mounting, close-grained cast iron with externally adjustable float switch and flange for pump mounting.

- c. Pump: Centrifugal; close coupled; vertical design; permanently aligned; bronze fitted, and with enclosed bronze case ring and mechanical seal; and mounted on receiver flange.
- d. Factory Wiring: Between pump and float switch, for single external electrical connection.

3. Installation:

- a. Install flexible connectors on suction and discharge sides of pump.
- b. Install single pressure gage on common manifold from pump suction and discharge.
- c. Support pumps and piping separately so piping is not supported by pumps.
- d. Provide suction diffuser and triple duty valve on each pump.
- e. Provide 6" housekeeping pads for equipment.
- f. Provide butterfly type isolation valve to suction side of each pump.

4. Accessories:

- a. NEMA 2-UL listed with H-O-A switches.
- b. Inlet basket strainer
- c. Mechanical alternator (Provide electrical alternator instead of mechanical alternator.)

5. Electrical - Unit shall require single electrical connection. All wiring shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of seal tight at the motor junction box.

6. Additional Notes: Steel receiver tanks are not acceptable

7. Design Standard Web product page:
<http://fhaspapp.ittind.com/literature/CATALOG-DP.stm#Condensate>

D3010.5 Water Treatment 15189 HVAC WATER TREATMENT

1. Acceptable manufacturers: LMI Milton Roy

- a. Pumps: horizontal centrifugal close coupled single stage end suction minimum 175 PSIG working pressure.
 - b. Motors shall include built-in, thermal-overload protection and grease-lubricated ball bearings. Select each motor to be non-overloading over full range of pump performance curve. Motors shall be high efficiency type.
 - c. Piping: Provide triple duty valve on each pump discharge and isolation valves to allow operation of alternate pump while servicing.
 - d. Controller: Shall be UL listed and housed in a NEMA 1 enclosure. Pump controller shall provide the following:
 - Low and high suction pressure alarm and cut out
 - Low and high system pressure alarm and cut out
 - No flow shut-down
 - Pump failure alarm
 - High temperature alarm
 - Low level alarm and cut out
 - Overload failure alarm
 - Automatic and manual alternation
3. Installation: Provide 6" housekeeping pads for equipment.
 4. Accessories: Add a jockey pump for larger capacity requirements.
 5. Electrical - Unit shall require single electrical connection.
 6. Additional Notes: Entire pump package shall be provided by single manufacturer. Units shall be factory assembled and tested.
 7. Design Standard Web product page: <http://www.bellgossett.com/>

**D3010.7
AND STACKS**

Breeching and Stacks 15500 BREECHINGS, CHIMNEYS,

1. Acceptable manufacturers: **Selkirk Metalbestos**, Heat-Fab Inc., Van Packer

The Schebler, Security Chimneys and Metal-Fab, Inc. are also acceptable manufacturers.

Manufacturer shall verify and certify venting system sizing calculations.

2. Description: Stack and breeching shall be double wall construction. Interior liner shall be AL29-4C super-feric stainless steel. Outer jacket shall be fabricated of type 430 stainless steel. Sections shall be assembled with mechanical locking bands and built in gaskets not requiring sealant.
3. Boiler breeching shall be round, double wall construction. Inner shell shall be ASTM A-666, type 304 stainless steel (0.035" thick min.). Outer jacket shall be fabricated of aluminized steel (0.025" thick min.) Sections shall be assembled by V-bands at flanged joints. V-bands shall be type 316 stainless steel and filled with silicone during installation for sealing. Boiler breeching shall be rated for 1000 deg. F continuously or 1700 deg. F for 10 minutes, with neutral or negative flue pressure up to 2" W.C. and positive pressure up to 60" W.C. at room temperature.
4. Installation: Vertical stack shall rest on 6" housekeeping pads, with cleanout door and drain. Stacks shall NOT be supported via wall bracket. Cleanouts shall be provided at each change in direction. Raincaps shall be provided at stack termination. Stack shall terminate 25'-0" from any outside air intakes.
5. Accessories: Provide adjustable, self-actuating barometric draft damper, type M+MG2 of Field Controls, on the common boiler breeching near the entrance to chimney (if boilers are forced draft type).

Provide Safe-Flex fabric type flexible connector of Mid-Atlantic Services for each boiler flue outlet.

6. Electrical: N/A
7. Additional Notes: Stack components shall be provided with a 15 year warranty. Boiler Breeching shall be provided with a 10 year warranty.
8. Design Standard Web product page: <http://www.selkirkinc.com>

D3010.8 BOILER

Steam Boilers 15512 CAST IRON BOILER, 15518 FIRE-TUBE

Note: Steam boilers are only to be used in like replacement applications. Hot water boilers shall be used in all new construction, in existing buildings as replacement if existing boilers are hot water type and for complete mechanical renovations except where noted.

1. Acceptable manufacturers:
 - a. Capacities: 200 boiler horsepower and below -H.B.Smith "4500 Series", Weil McLain 94 Series, Burnham V11 Series
 - b. Capacities: Over 200 boiler horsepower - H.B.Smith "6500 Series", Cleaver Brooks CB (Burnham-make, EASCO-make, Rockmills-make and Superior-make fire-tube boilers are also acceptable.)
2. Description: Boiler shall be cast iron sectional or four pass fire tube manufactured by ISO 9001 registered company to conform to Section IV of the ASME Boiler code and Pressure vessel code. Boiler shall be designed for combination firing gas and No. 2 oil (except where noted).
3. Fire tube boilers shall be either packaged type or field-erected type, of three pass full wet back fire tube design, with two passes of fire tubes, horizontal updraft type, designed with five (5) sq. ft. of heating surface measured on the fireside per rated boiler horsepower. The furnace chamber shall be sized to have heat release rate of 80,000 Btu/cu.ft or less. Use of refractory baffling to provide the second or third pass shall not be permitted. The fire tubes shall be at least 2.5" dia. x 10 ga. (or 0.1345" thick) each, set with roller expander at each end, and shall be flared and beaded. The main pass to be of at least 39" dia. fire tube. Welding of tube ends to tube sheets will not be permitted. There shall be two separate rear tube sheets combustion chamber tube sheet and rear tube sheet of minimum 5/8" thick. The rear combustion chamber shall be submerged within the boiler water. It shall be complete with heavy rigid steel base frame, forced draft burner supported on the separate base pedestal, burner controls, boiler trim, and thermal insulation. Front and rear tube sheets and all flues shall be fully accessible for inspection and cleaning when doors are opened. Access to front tube sheet shall not require disconnecting any fuel lines or electrical wiring. The boiler unit shall have 2" thick, 8 lb./cu. ft. density fiberglass blanket insulation with 22 ga. thick sheet metal jacket, enameled from outside and coated with high temperature resistant aluminum paint from inside.
4. Installation: Boiler control panel shall be installed separate from boiler providing link between unit controls and DDC system furnished on free standing support and provided with an overhead light mounted on support. Manual override switch shall be provided on boiler control panel to permit operator override of DDC system. Furnish with diagnostics port for portable operator terminal on control panel. Boiler controls shall interface with building automation system. Provide 6" housekeeping pads for boilers and associated equipment including but

not limited to circulators, condensate receivers, feed water systems, water treatment equipment.

5. Accessories:
 - a. Burner: Industrial Combustion Low NOX type.
 - b. Controls: Honeywell (Use combustion control of Fireye)
6. Electrical - Unit shall require single electrical connection. All wire shall be run in EMT (preferably in rigid steel conduits). Motors requiring wire run in EMT (rigid steel conduits) shall have a (flexible conduit to) 2' length of seal tight at the motor junction box
7. Additional Notes: All boilers shall be low pressure type. Design shall provide two boilers, (each) sized at 75% of total system design capacity. In the event three boilers are required each shall be sized at 50% (40%) of total system design capacity. Specified boiler shall be selected at the design load as indicated above and within the mid-range of the model type furnished. Design shall incorporate catwalks and ladders where required to service relief valves at and above 8'-0". Consultant shall file with State office of Labor and Industry for an "Intent to Install" permit at the conclusion of design phase.
8. Design Standard Web product page: <http://www.smithboiler.com/>

D3010.9 BOILER

Hot Water Boilers 15512 CAST IRON BOILER, 15518 FIRE-TUBE

1. Acceptable manufacturers:
 - a. Capacities: 200 boiler horsepower and below - Buderus "G615 Series" H.B.Smith 4500 Series, Weil McLain 94 Series,
 - b. Capacities: Over 200 boiler horsepower - H.B.Smith "6500 Series", Cleaver Brooks CB (Burnham-make, EASCO-make, Rockmills-make and Superior-make fire-tube boilers are also acceptable.)
2. Description: Boiler shall be cast iron sectional or four pass fire tube manufactured by ISO 9001 registered company to conform to Section IV of the ASME Boiler code and Pressure vessel code. Boiler shall be designed for combination firing gas and No. 2 oil (except where noted). Fire tube boilers shall be either packaged type or field-erected type, of three pass full wet back fire tube design, with two passes of fire tubes, horizontal updraft type, designed with five (5) sq. ft. of heating surface measured on the fireside per rated boiler horsepower. The furnace chamber shall be sized to have heat release rate of 80,000 Btu/cu.ft or

less. Use of refractory baffling to provide the second or third pass shall not be permitted. The fire tubes shall be at least 2.5" dia. x 10 ga. (or 0.1345" thick) each, set with roller expander at each end, and shall be flared and beaded. The main pass to be of at least 39" dia. fire tube. Welding of tube ends to tube sheets will not be permitted. There shall be two separate rear tube sheets combustion chamber tube sheet and rear tube sheet of minimum 5/8" thick. The rear combustion chamber shall be submerged within the boiler water. It shall be complete with heavy rigid steel base frame, forced draft burner supported on the separate base pedestal, burner controls, boiler trim, and thermal insulation. Front and rear tube sheets and all flues shall be fully accessible for inspection and cleaning when doors are opened. Access to front tube sheet shall not require disconnecting any fuel lines or electrical wiring. The boiler unit shall have 2" thick, 8 lb./cu. ft. density fiberglass blanket insulation with 22 ga. thick sheet metal jacket, enameled from outside and coated with high temperature resistant aluminum paint from inside.

3. Installation: Boiler control panel shall be installed separate from boiler providing link between unit controls and DDC system furnished on free standing support and provided with an overhead light mounted on support. Manual override switch shall be provided on boiler control panel to permit operator override of DDC system. Furnish with diagnostics port for portable operator terminal on control panel. Boiler controls shall interface with building automation system. Provide 6" housekeeping pads for boilers and associated equipment including but not limited to circulators, condensate receivers, feedwater systems, water treatment equipment.
4. Accessories:
 - a. Burner: Industrial Combustion Low NOX type.
 - b. Controls: Honeywell (Use Fireye) flame failure controls
 - c. Metering: Provide wafer type flow meter ring for use with portable flow meter.
5. Electrical - Unit shall require single electrical connection. All wire shall be run in EMT (preferably in rigid steel conduits). Motors requiring wire run in EMT (rigid steel conduits) shall have a (flexible conduit to) 2' length of seal tight at the motor junction box
6. Additional Notes: All boilers shall have a maximum operating temperature of 180°F (200 deg. F) and system ΔT of 20°F. Design shall provide two boilers, (each) sized at 75% of total system design capacity. In the event three boilers are required each shall be sized at 50% (40%) of total system design capacity. Specified boiler shall

selected at the design load as indicated above and within the mid-range of the model type furnished. Operating temperatures shall be 180-160 degrees F. Design shall incorporate catwalks and ladders where required to service relief valves at and above 8'-0". Consultant shall file with State office of Labor and Industry for an "Intent to Install" permit at the conclusion of design phase.

7. Design Standard Web product page:
<http://www.buderus.net/products/boilers.asp>,
<http://www.smithboiler.com/>

D3010.10 Feed water Systems EQUIPMENT

15520 FEEDWATER

1. Acceptable manufacturers: **Domestic, ITT Fluid Technology Corp.**, Aurora/Pentair Pump Group., Cleaver-Brooks; Div. of Aqua-Chem, Inc. (delete this last one)

MEPCO, Shipco and Flotronics Pumps are also acceptable manufacturers

2. Description: Factory assembled and tested unit consisting of a condensate receiver, feed water pumps, controls with the following features and accessories:
 - a. 304 Stainless Steel Receiver
 - b. Structural-steel stand to support receiver and pumps. (Not necessarily required)
 - c. Inlet strainer
 - d. Gage glass with stops at top and bottom
 - e. Dial-type thermometer.
 - f. Pump suction and discharge isolation valves
 - g. Stainless steel float-operated (should be solenoid operated) makeup-water valve
 - h. Pump(s) rated for 175-psig minimum working pressure and a continuous water temperature of 225 deg F
 - i. Feedwater Pump Control Panel
3. Installation: Provide 6" housekeeping pads equipment.
4. Accessories:
5. Electrical - Unit shall require single electrical connection. All wire shall be run in EMT (preferably in rigid steel conduits). Motors requiring wire run in EMT (rigid steel conduits) shall have a (flexible conduit to) 2'

length of sealtight at the motor junction box

6. Additional Notes: Provide one pump per boiler. Provide one spare feedwater pump and float assembly.
7. Design Standard Web product page:
<http://fhaspapp.ittind.com/literature/CATALOG-DP.stm>

D3010.11 Makeup Air Units 15561 MAKEUP AIR UNITS

1. Acceptable manufacturers: **CaptiveAire**, Engineered Aire, Greenheck

(Trane, Temptrol, Aeon, Carrier, and McQuay are also acceptable manufacturers, subject to specification requirement.)
2. Description
 - a. Configuration: Draw-thru coil with hydronic or DX cooling (where required), and hydronic or indirected fired heating.
 - b. Casing: Exterior walls and interior walls are to be constructed of 16 gauge galvanized steel with pre-painted, baked enamel finish over electro-flash coat galvanizing passing 500-hour salt spray test (ASTM B-117) for pre painted steel and 125-hour marine level 1 prohesion test (ASTM G-85.A5) for pre painted steel. Sections shall be supplied with 16-gauge corrosion resistant G90 galvanized pre-painted steel. Casing panels have no exterior exposed raw edges that could lead to rust formation. All casing corners are radiused or chamfered. All panels seal against a full perimeter automotive style gasket to ensure a tight seal. Unit housing shall be cross broken and pitched to prevent the collection of water on the tops of sections.
 - c. Insulation: All sections shall be insulated with a minimum value of R-13.
 - d. Fan section: Fan shall be draw thru type double width double inlet utilizing forward curved blades or air foil blades (consultant shall selected based on fan HP requirements). Fans shall have AMCA class rating for the capacity indicated. Fan wheels and shafts shall be selected with a maximum rated fan speed 25% below the first critical.
 - e. Mounting: Fan scroll, wheel, shaft, bearings, drives and motor shall be mounted on common base assembly. The base

assembly shall be isolated from the outer casing on factory installed springs and vibration absorbent fabric on the scroll.
Canvas style duct connections are NOT acceptable.

- f. Motors shall be high efficiency type.
 - g. Bearings shall be provided with extended grease fittings. Bearings shall be rated for 200,000 hours. Drive shall be designed for 2.0 service factor.
 - h. Drain pan shall be double wall insulated stainless steel construction. Drain connection shall be 1-1/4" MPT and insulated from the point of connection to the pan to point at which it exits the casing.
 - i. Access doors shall be equipped with two (2) cam lock non-removable handles per door and furnished on the following sections: Coil (access section), fan, filter, filter mixing box, mixing box.
 - j. Filter section shall be equipped for 30% 2" pleated throwaway type filters
 - k. Motorized inlet damper with end switch to prove position before burner will fire.
 - l. Heat Exchanger: All stainless-steel construction (aluminized steel is NOT acceptable) for natural indirect gas-fired burners with the following controls:
 - (1) Redundant dual gas valve with manual shutoff.
 - (2) Direct-spark pilot ignition.
 - (3) Electronic flame sensor.
 - (4) Induced-draft blower.
 - (5) Flame rollout switch.
 - (6) Purge-Period Timer
3. Installation: Provide dunnage, roof curbs and flashing required for installation. Install stand-alone control module providing link between unit controls and (LonWorks based) DDC system. Furnish with diagnostics port for portable operator terminal on control panel. Install units with factory recommended clearances for service and maintenance.
4. Accessories: Provide factory installed disconnect switch. Provide three complete sets of filters for each unit. Provide one additional set of belts. Provide piping compartment if piped thru curb (exposed piping

above roof is not permitted).

5. Electrical - Unit shall require single electrical connection. All wiring 120 volt and higher and wire size #8 and smaller shall be run in MC Cable. All wire size #6 and larger shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
6. Additional Notes: All units shall be equipped with pleated throwaway filter racks. Warranty heat exchangers for 10 years.
7. Design Standard Web product page: <http://www.captiveaire.com/>

**D3010.12 Absorption Chillers 15621 INDIRECT-FIRED ABSORPTIONS
WATER CHILLER**

Absorption chillers are not acceptable.

**D3010.13 Centrifugal Chillers 15625 CENTRIFUGAL WATER
CHILLER**

1. Acceptable manufacturers: Carrier 19XR, McQuay, YORK International Corporation
2. Description: Factory-assembled and -tested water chiller complete with compressor, evaporator, condenser, controls, interconnecting unit piping and wiring, indicated accessories, and mounting frame.
 - a) Compressors: Variable displacement with direct-drive, hermetically sealed or direct-drive, semi-hermetically sealed motor.
 - b) Refrigerant: HFC-134a, or HFC-410
 - c) Evaporator: Shell-and-tube design, ASME labeled, Shell Material-Carbon steel, Tube Construction-Individually replaceable, expanded into tube sheets, Material-copper, Minimum Size-3/4-inch OD; 0.028-inch wall thickness, Internal Finish: enhanced, Water Box: Standard, with design working pressure of 150 psig and having flanged water-nozzle connections with a thermistor-type temperature sensor factory installed in each nozzle.
 - d) Condenser: Shell-and-tube design ASME labeled, Shell Material-Carbon steel, Tube Construction-Externally enhanced and individually replaceable, expanded into tube sheets, Material-

Copper, Minimum Size: 3/4-inch OD; 0.028-inch wall thickness, Internal Finish-Enhanced water Box-Standard with design working pressure of 150 psig and having flanged water-nozzle connections with a thermistor-type temperature sensor factory installed in each nozzle.

- e) Insulation: Cold Surfaces: Closed-cell, flexible elastomeric, thermal insulation complying with ASTM C 534, Type II, for sheet materials. Thickness: 3/4 inch Factory apply insulation over entire surfaces of water chiller components.
- f) Controls Control Panel: Stand-alone, microprocessor based, Enclosure-Unit-mounted, NEMA 250, Type 1 enclosure, lockable; factory wired with a single-point power connection and a separate control circuit. Status Display: Multiple-character liquid-crystal display or light-emitting diodes and keypad. Display the following conditions:
 - 1.) Date and time.
 - 2.) Operating or alarm status.
 - 3.) Operating hours.
 - 4.) Outside-air temperature if required for chilled-water reset.
 - 5) Temperature and pressure operating set points.
 - 6.) Entering and leaving temperatures of chilled water and condenser water.
 - 7.) Refrigerant pressures in evaporator and condenser.
 - 8) Saturation temperature in evaporator and condenser.
 - 9.) Oil temperature and pressure.
 - 10.) Percent of maximum motor amperage.
 - 11.) Current-limit set point.
 - 12.) Number of compressor starts.
- g.) Control Functions
 - 1.) Manual or automatic startup and shutdown time schedule.
 - 2.) Entering and leaving chilled-water temperatures, control set points, and motor load limit. Chilled-water temperature shall be reset based on return-water temperature.
 - 3.) Current limit and demand limit.
 - 4.) Condenser-water temperature.
 - 5.) External water chiller emergency stop.
- h). Manually Reset Safety Controls: The following conditions shall shut down water chiller and require manual reset:
 - 1.) Low evaporator temperature; high condenser pressure.
 - 2.) Low chilled-water temperature.
 - 3.) Low oil differential pressure.
 - 4.) High or low oil pressure.

- 5.) High oil temperature.
- 6.) High compressor-discharge temperature.
- 7.) Loss of chilled- or condenser-water flow.
- 8.) Electrical overload.
- 9.) Sensor- or detection-circuit fault.
- 10.) Processor communication loss.
- 11.) Starter fault.
- 12.) Extended compressor surge.

i.) Building Management System Interface: Factory-installed hardware and software to enable building management system to monitor and control chilled-water set point and chiller-control displays and alarms.

8. Installation: All chillers shall have a minimum operating temperature of 42°F and system ΔT of 12°F. Provide strainer in addition to pump strainer a maximum 10'-0" from chiller piping inlets. Provide necessary isolation valves to service oil filter(s) without evacuation of refrigerant. Provide 6" housekeeping pads equipment. Furnish with diagnostics port for portable operator terminal on control panel. Install stand-alone control module providing link between unit controls and (LonWorks based) DDC system. Install units with factory recommended clearances for service and maintenance.
9. Accessories: Pressure Relief Rupture Disc: Frangible carbon disc. Sound attenuation kit to reduce ambient noise to 68 DB. Attenuation kit shall isolate the compressor only. Two (2) hand held controllers. Provide wafer type flow meter ring for use with portable flow meter on both condenser and chilled water outlets.
10. Electrical - Unit shall require single electrical connection to the main electrical panel. The electrical panel shall be NEMA 12 rated and mounted on the unit as shown on the General Arrangement drawings. The electric panel shall consist of a non-fused disconnect, fused IEC full voltage starters for each motor, control power transformer, and HOA switch for the unit. Electrical panels shall bear an ETL label. All wiring 120 volt and higher run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
11. Additional Notes: Centrifugal chiller use is restricted to tonnages in excess of 500. Comply with Green Seal's GS-31 for Full Load Efficiency 0.56 Kw/Ton and Integrated Part-Load Value (IPLV) efficiency of 0.44 Kw/Ton. Operating temperatures 54F. EWT, 44F. LWT. **The following refrigerants are NOT permitted: R-22, and R-123.**
12. Design Standard Web product page:

D3010.14 Water Cooled Screw Chillers 15626 ROTARY SCREW WATER CHILLERS

1. Acceptable manufacturers: **Carrier 30HXC**, McQuay, YORK International Corporation
2. Description: Factory-assembled and -tested water chiller complete with compressor, evaporator, condenser, controls, interconnecting unit piping and wiring, indicated accessories, and mounting frame.
 - a. Compressors: Minimum two compressors, with two separate circuits, rotary screw variable displacement with direct-drive, hermetically sealed or direct-drive, semi-hermetically sealed motor.
 - b. Refrigerant: HFC-134a, or HFC-410
 - c. Evaporator: Shell-and-tube design, ASME labeled, Shell Material-Carbon steel, Tube Construction-Individually replaceable, expanded into tube sheets, Material-copper, Minimum Size-3/4-inch, OD; 0.028-inch wall thickness, Internal Finish: enhanced, Water Box: Standard, with design working pressure of 150 psig and having flanged water-nozzle connections with a thermistor-type temperature sensor factory installed in each nozzle.
 - d. Condenser: Shell-and-tube design ASME labeled, Shell Material-Carbon steel, Tube Construction-Externally enhanced and individually replaceable, expanded into tube sheets, Material-Copper, Minimum Size: 3/4-inch OD; 0.028-inch wall thickness, Internal Finish-Enhanced, Water Box-Standard with design working pressure of 150 psig and having flanged water-nozzle connections with a thermistor-type temperature sensor factory installed in each nozzle.
 - e. Insulation: Cold Surfaces: Closed-cell, flexible elastomeric, thermal insulation complying with ASTM C 534, Type II, for sheet materials. Thickness: 3/4 inch Factory applied insulation over entire surfaces of water chiller components.
 - f. Controls Control Panel: Stand-alone, microprocessor based, Enclosure-Unit-mounted, NEMA 250, Type 1 enclosure, lockable; factory wired with a single-point power connection and a separate control circuit. Status Display: Multiple-character liquid-crystal display or light-emitting diodes and keypad. Display the following conditions:
 - 1.) Date and time.

- 2.) Operating or alarm status.
- 3.) Operating hours.
- 4.) Outside-air temperature if required for chilled-water reset.
- 5.) Temperature and pressure operating set points.
- 6.) Entering and leaving temperatures of chilled water and condenser water.
- 7.) Refrigerant pressures in evaporator and condenser.
- 8.) Saturation temperature in evaporator and condenser.
- 9.) Oil temperature and pressure.
- 10.) Percent of maximum motor amperage.
- 11.) Current-limit set point.
- 12.) Number of compressor starts.

g. Control Functions

- 1.) Manual or automatic startup and shutdown time schedule.
- 2.) Entering and leaving chilled-water temperatures, control set points, and motor load limit. Chilled-water temperature shall be reset based on return-water temperature.
- 3.) Current limit and demand limit.
- 4.) Condenser-water temperature.
- 5.) External water chiller emergency stop.

h. Manually Reset Safety Controls: The following conditions shall shut down water chiller and require manual reset:

- 1.) Low evaporator temperature; high condenser pressure.
- 2.) Low chilled-water temperature.
- 3.) Low oil differential pressure.
- 4.) High or low oil pressure.
- 5.) High oil temperature.
- 6.) High compressor-discharge temperature.
- 7.) Loss of chilled- or condenser-water flow.
- 8.) Electrical overload.
- 9.) Sensor- or detection-circuit fault.
- 10.) Processor communication loss.
- 11.) Starter fault.
- 12.) Extended compressor surge.

i. Building Management System Interface: Factory-installed hardware and software to enable building management system to monitor and control chilled- water set point and chiller-control displays and alarms.

3. Installation: All chillers shall have a minimum operating temperature of 42°F and system ΔT of 12°F. Provide strainer in addition to pump(s)

maximum 10'-0" from chiller piping inlets. Provide necessary isolation valves to service oil filter(s) without evacuation of refrigerant. Provide 6" housekeeping pads equipment. Furnish with diagnostics port for portable operator terminal on control panel. Install stand-alone control module providing link between unit controls and (LonWorks based) DDC system. Install units with factory recommended clearances for service and maintenance.

4. Accessories: Sound attenuation kit to reduce ambient noise to 68 DB. Attenuation kit shall isolate the compressor only. Frangible carbon rupture disc. Two (2) hand held controllers. Provide wafer type flow meter ring for use with portable flow meter on both condenser and chilled water outlets.
5. Electrical - Unit shall require single electrical connection to the main electrical panel. The electrical panel shall be NEMA 12 rated and mounted on the unit as shown on the General Arrangement drawings. The electric panel shall consist of a non-fused disconnect, fused IEC full voltage starters for each motor, control power transformer, and HOA switch for the unit. Electrical panels shall bear an ETL label.
6. Additional Notes: Screw chiller use is restricted to loads below 250 tons. Provide multiple chillers for loads up to and including 500 tons. Comply with Green Seal's GS-31 for Full Load Efficiency 0.64 Kw/Ton and Integrated Part-Load Value (IPLV) efficiency of 0.49 Kw/Ton. Operating temperatures 54F. EWT, 44F. LWT. The following refrigerants are NOT permitted: R-22, and R-123.
7. Design Standard Web product page:
http://www.commercial.carrier.com/details/0,1240,CLI1_DIV12_ETI1508,00.html

D3010.15 CHILLERS

Air Cooled Screw Chillers

15628 AIR COOLED WATER

1. Acceptable manufacturers: Carrier 30GXR, McQuay, YORK International Corporation
2. Description: Factory-assembled and -tested water chiller complete with casing, compressor, heat exchanger, condenser coils, fans, and controls integrated with compressor operation.
 - a) Compressors: (2) Rotary screw variable displacement with direct- drive, hermetically sealed or direct-drive, semi-hermetically sealed motor.

- b) Refrigerant: HFC-134a, or HFC-410
- c) Evaporator: Shell-and-tube design, ASME labeled, Shell Material- Carbon steel, Tube Construction-Individually replaceable, expanded into tube sheets, Material-copper, Minimum Size-3/4-inch OD; 0.028-inch wall thickness, Internal Finish: enhanced, Water Box: Standard, with design working pressure of 150 psig and having flanged water-nozzle connections with a thermistor-type temperature sensor factory installed in each nozzle.
- d) Condenser: Coil shall be aluminum bonded to copper fins and pressure tested to 450 psig. Refrigerant circuit to include oil separator, high and low side pressure relief devices, discharge and liquid line shutoff valves, filter dryer, moisture indicating sight glass electronic expansion device and refrigerant economizer.
- e) Insulation: Cold Surfaces: Closed-cell, flexible elastomeric, thermal insulation complying with ASTM C 534, Type II, for sheet materials. Thickness: 3/4 inch Factory applied insulation over entire surfaces of water chiller components.
- f) Controls Control Panel: Stand-alone, microprocessor based, Enclosure-Unit-mounted, NEMA 250, Type 1 enclosure, lockable; factory wired with a single-point power connection and a separate control circuit. Status Display: Multiple-character liquid-crystal display or light-emitting diodes and keypad. Display the following conditions:
 - 1.) Date and time.
 - 2.) Operating or alarm status.
 - 3.) Operating hours.
 - 4) Temperature and pressure operating set points.
 - 5.) Entering and leaving temperatures of chilled water
 - 6.) Refrigerant pressures in evaporator and condenser.
 - 8) Saturation temperature in evaporator and condenser.
 - 9.) Percent of maximum motor amperage.
 - 10.) Current-limit set point.
 - 11.) Number of compressor starts.
- g.) Control Functions
 - 1.) Manual or automatic startup and shutdown time schedule.
 - 2.) Entering and leaving chilled-water temperatures, control set points, and motor load limit. Chilled-water temperature shall be reset based on return-water temperature.
 - 3.) Current limit and demand limit.
 - 4.) External water chiller emergency stop.
- h.) Manually Reset Safety Controls: The following conditions shall

shut down water

chiller and require manual reset:

- 1.) Low evaporator temperature; high condenser pressure.
- 2.) Low chilled-water temperature.
- 3.) High compressor-discharge temperature.
- 4.) Loss of chilled water flow.
- 5.) Electrical overload.
- 6.) Sensor- or detection-circuit fault.
- 7.) Processor communication loss.
- 8.) Starter fault.
- 9.) Extended compressor surge.

i. Building Management System Interface: Factory-installed hardware and software to enable building management system to monitor and control chilled-water set point and chiller-control displays and alarms.

8. Installation: All chillers shall have a minimum operating temperature of 42°F and system ΔT of 12°F. Provide necessary dunnage and vibration isolation. Unit shall be installed level within factory tolerances. Install stand-alone control module providing link between unit controls and (LonWorks based) DDC system. Furnish with diagnostics port for portable operator terminal on control panel. Install units with factory recommended clearances for service and maintenance. Provide strainer in addition to pump strainer maximum 10'-0" from chiller piping inlet.
9. Accessories: Two (2) hand held controllers. Provide wafer type flow meter ring for use with portable flow meter on chilled water outlet.
10. Electrical - Unit shall require single electrical connection to the main electrical panel. The electrical panel shall be NEMA 12 rated and mounted on the unit as shown on the General Arrangement drawings. The electric panel shall consist of a non-fused disconnect, fused IEC full voltage starters for each motor, control power transformer, and HOA switch for the unit. Electrical panels shall bear an ETL label.
11. Additional Notes: Comply with Green Seal's GS-31 for Full Load Efficiency 0.64 Kw/Ton and Integrated Part-Load Value (IPLV) efficiency of 0.49 Kw/Ton. Operating temperatures 54F. EWT, 44F. LWT.
12. Design Standard Web product page:
<http://www.commercial.carrier.com/>

D3010.16 Cooling Towers 15641 OPEN CIRCUIT, MECHANICAL DRAFT

COOLING

TOWERS

1. Acceptable manufacturers: Evapco LSTA, Baltimore Air Coil, Marley Corporation
2. Description: Induced-draft, counter-flow cooling tower, factory-assembled and tested complete with PVC fill, draft eliminators, and rigging supports. Unit shall be ALL stainless steel construction.
3. Installation: Provide necessary dunnage. Install control module providing link between unit controls and (LonWorks based) DDC system. Furnish with diagnostics port for portable operator terminal on control panel. Install units with factory recommended clearances for service and maintenance
4. Accessories: Two speed motors, ladder, screened bottom panel, manufacturer's vibration isolation rails. Provide wafer type flow meter rig for use with portable flow meter on condenser water outlet.
5. Electrical - Unit shall require single electrical connection. All wiring shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
6. Additional Notes: Sump heater shall be provided by the manufacturer. Heat tracing shall be provided by the contractor.
7. Design Standard Web product page: <http://www.evapco.com>

D3010.17 Indoor Air Handling Units HANDLING UNITS

15725 MODULAR INDOOR AIR

1. Acceptable manufacturers: Carrier 39M, McQuay Company, Trane, YORK International Corporation
2. Description
 - a. Casing: Exterior walls and interior walls are to be constructed of 16 gauge galvanized steel with pre-painted, baked enamel finish over electro-flash coat galvanizing passing 500-hour salt spray test (ASTM B-117) for pre painted steel and 125-hour marine level 1 prohesion test (ASTM G-85.A5) for pre painted steel. Aglon anti microbial agent blended with paint used for internal wall surfaces. Panels and frames shall be thermally broken. Sections shall be supplied with 16-gauge corrosion resistant

G90 galvanized pre-painted steel 6" high structural base rails (bolt-on legs are not permitted). All panels seal against a full perimeter automotive style gasket to ensure a tight seal. Perimeter 10 gauge lifting lugs for overhead rigging shall be provided.

- b. Insulation: All sections shall be insulated with polymer foam bonded to the panels (NOT fiberglass) with a minimum value of R-13. Interior of unit shall be designed to permit steam cleaned without potential damage to insulation.
- c. Fan section: Fan shall be draw thru type double width double inlet utilizing forward curved blades or air foil blades (consultant shall selected based on fan HP requirements). Fans shall have AMCA class rating for the capacity indicated. Fan wheels and shafts shall be selected with a maximum rated fan speed 25% below the first critical.
- d. Mounting: Fan scroll, wheel, shaft, bearings, drives and motor shall be mounted on common base assembly. The base assembly shall be isolated from the outer casing on factory installed springs and vibration absorbent fabric on the scroll. Canvas style duct connections are NOT acceptable.
- e. Coil sections shall be designed to permit both vertical and horizontal coil removal. Coils shall be certified in accordance with ARI standard 410. All coils shall be rated for 450 psig. Coil wall thickness shall be 0.035 in.
- f. Motors shall be high efficiency type.
- g. Bearings shall be provided with extended grease fittings to the exterior of the fan casings. Bearings shall be rated for 200,000 hours. Drive shall be designed for 2.0 service factor.
- h. Drain pan shall be double wall insulated stainless steel construction. Drain connection shall be 1-1/4" MPT and insulated from the point of connection to the pan to point at which it exits the casing.
- i. Access doors shall be equipped with two (2) cam lock removable handles and furnished on the following sections: Coil (access section), fan, filter, filter mixing box, mixing box.
- h. Filter section shall be incorporated in mixing box section where possible. Filters shall be 30% 2" throwaway type.
- i. Air blenders shall be provided on all units with 25% or greater minimum outside air. The air mixer shall be fabricated of .081-in. aluminum of size, performance and maximum pressure drop indicated. The air mixer shall mix two or more airstreams of differing temperature to within +/- 6 degrees Fahrenheit of theoretical mixed air temperature and provide a more uniform air velocity contour entering a downstream filter or coil bank.
- j. Marine lights and view ports shall be furnished on any accessible sections 5'-0" or higher. Lights shall be wired to a casing

- mounted switch on the exterior of the unit.
- k. Water Coil Sections: Common or individual, insulated, galvanized-steel casings for heating and cooling coils. Design and construct to facilitate removal and replacement of coil for maintenance and to ensure full airflow through coils. Self-draining coil fabricated according to ARI 410. Tubes/Fins: Copper/Aluminum with fin spacing 0.125. Headers: Cast iron with drain and air vent tappings. Frames: Galvanized-steel channel frame, 0.079 inch. Ratings: Design tested and rated according to ASHRAE 33 and ARI 410. Working-Pressure Ratings: 200 psig, 325 deg F.
3. Installation: Provide housekeeping pad. Provide floor drains adjacent to unit with condensate piping. Install stand-alone control module providing link between unit controls and (LonWorks based) DDC system. Furnish with diagnostics port for portable operator terminal on control panel. Install units with factory recommended clearances for service and maintenance.
 4. Accessories: All units shall be equipped with 100% economizers. Pleated throwaway filter racks. Units shall be equipped with internal isolation. Provide temperature and pressure gauges at each coil. Provide three complete sets of filters for each unit. Provide one additional set of belts. Provide wafer type flow meter ring for use with portable flow meter on chilled and heating water inlet.
 5. Electrical - Unit shall require single electrical connection. All wiring shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
 6. Additional Notes: Air velocities shall not exceed 500/600 FPM for cooling/ heating coils. All units shall be equipped with internal isolation. Drain pan shall be provided with level sensor in compliance with IBC 2003 to shut down and alarm at DDC.
 7. Design Standard Web product page:
<http://www.commercial.carrier.com/>

D3010.18 Rooftop Units 15732 ROOFTOP AIR CONDITIONERS

1. Acceptable manufacturers: Racan, Gouvernaire, Miller Picking

Trane, Temptrol, Aaon, McQuay and York also will be acceptable manufacturers, subject to specification requirement.

2. Description:

- a. Configuration: Draw-thru coil with hydronic or DX cooling (where provided), and hydronic or indirect fired heating. Units shall be designed for 100% economizer operation.
- b. Casing: Exterior walls and interior walls are to be constructed of 16 gauge galvanized steel with pre-painted, baked enamel finish over electro-flash coat galvanizing passing 500-hour salt spray test (ASTM B-117) for pre painted steel and 125-hour marine level 1 prohesion test (ASTM G-85.A5) for pre painted steel. Aglon anti microbial agent blended with paint used for internal wall surfaces. Panels and frames shall be thermally broken. Sections shall be supplied with 16-gauge corrosion resistant G90 galvanized pre-painted steel 6" high structural base. All panels seal against a full perimeter automotive style gasket to ensure a tight seal. Perimeter 10 gauge lifting lugs for rigging shall be provided. Unit housing shall be cross broken and pitched to prevent the collection of water on the tops of sections.
- c. Insulation: All sections shall be insulated with polymer foam bonded to the panels (NOT fiberglass) with a minimum value of R-13. Interior of unit shall be designed to permit steam cleaned without potential damage to insulation.
- d. Fan section: Fan shall be draw thru type double width double inlet utilizing forward curved blades or air foil blades (consultant shall selected based on fan HP requirements). Fans shall have AMCA class rating for the capacity indicated. Fan wheels and shafts shall be selected with a maximum rated fan speed 25% below the first critical.
- e. Mounting: Fan scroll, wheel, shaft, bearings, drives and motor shall be mounted on common base assembly. The base assembly shall be isolated from the outer casing on factory installed springs and vibration absorbent fabric on the scroll. Canvas style duct connections are NOT acceptable.
- f. Coil sections shall be designed to permit both vertical and horizontal coil removal. Coils shall be certified in accordance with ARI standard 410. All coils shall be rated for 450 psig. Coil wall thickness shall be 0.035 in.
- g. Motors shall be high efficiency type.
- h. Bearings shall be provided with extended grease fittings. Bearings shall be rated for 200,000 hours. Drive shall be designed for 2.0 service factor.
- i. Drain pan shall be double wall insulated stainless steel construction. Drain connection shall be 1-1/4" MPT and insulated from the point of connection to the pan to point at which it exits the casing.
- j. Access doors shall be equipped with two (2) cam lock

removable handles per door and furnished on the following sections: Coil (access section), fan, filter, filter mixing box, mixing box.

- k. Filter section shall be incorporated in mixing box section where possible. Filters shall be 30% 2" pleated throwaway type
 - l. Air blenders shall be provided on all units with 25% or greater minimum outside air. Air Mixer shall be .081-in. aluminum of size, performance and maximum pressure drop indicated. The Air mixer shall mix two or more airstreams of differing temperature to within +/- 6 degrees Fahrenheit of theoretical mixed air temperature and provide a more uniform air velocity contour entering a downstream filter or coil bank.
 - m. Marine lights shall be furnished on any accessible sections 5'-0" or higher. Lights shall be wired to an externally mounted waterproof switch.
 - n. Water Coil Sections: Individual, insulated, galvanized-steel casings for heating and cooling coils. Design and construct to facilitate removal and replacement of coil for maintenance and to ensure full airflow through coils. Self-draining coil fabricated according to ARI 410. Tubes/Fins: Copper/Aluminum with fin spacing 0.125. Headers: Cast iron with drain and air vent tappings. Frames: Galvanized-steel channel frame, 0.079 inch. Ratings: Design tested and rated according to ASHRAE 33 and ARI 410. Working-Pressure Ratings: 200 psig, 325 deg F.
 - o. Outside Coil Fan: Propeller type, directly driven by motor.
 - p. Refrigerant Coils: Aluminum-plate fin and seamless copper tube in steel casing with equalizing-type vertical distributor.
 - q. Compressor: Hermetic scroll compressor with integral vibration isolators, internal over-current and over-temperature protection, internal pressure relief, and crankcase heater.
 - r. Motorized inlet damper with to prove position before burner will fire.
 - s. Heat Exchanger: All stainless-steel construction (aluminized steel is NOT acceptable) for natural gas-fired burners with the following controls:
 - (1) Redundant dual gas valve with manual shutoff.
 - (2) Direct-spark pilot ignition.
 - (3) Electronic flame sensor.
 - (4) Induced-draft blower.
 - (5) Flame rollout switch.
 - (6) Purge-Period Timer
3. Installation: Provide dunnage, roof curbs and flashing required for installation. Provide condensate piping to roof drains. Install stand-alone control module providing link between unit controls and (LonWorks based) DDC system. Furnish with diagnostics port for

portable operator terminal on control panel. Install units with factory recommended clearances for service and maintenance.

4. Accessories: Provide freeze protection circulators on all hydronic coils. Provide temperature and pressure gauges at each coil. Provide factory installed disconnect switch and convenience outlet. Provide three complete sets of filters for each unit. Provide one additional set of belts. Provide piping compartment if piped thru curb (exposed piping above roof is not permitted). Provide wafer type flow meter ring for use with portable flow meter on chilled and heating water inlet.
5. Electrical - Unit shall require single electrical connection. All wiring shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
6. Additional Notes: All units shall be equipped with 100% economizers. Pleated throwaway filter racks. Air velocities shall not exceed 500/600 FPM for cooling/heating coils. Units shall be equipped with internal isolation. Warranty heat exchangers and compressors for 10 years. Provide temperature and pressure gauges at each coil. Provide three complete sets of filters for each unit.
7. Design Standard Web product page:
<http://www.commercial.carrier.com/>

D3010.19 Fan Coils 15763 FAN-COIL UNITS

1. Acceptable manufacturers: Carrier, McQuay, YORK International Corporation
2. Description
 - a. Chassis: Galvanized steel, with flanged edges.
 - b. Cabinet: Galvanized steel, with removable panels. Finish: bonderize, phosphatized, and flow-coat with baked-on primer with manufacturer's standard topcoat paint. Vertical Unit Front Panels: Removable, galvanized steel, with and channel-formed edges and with insulation on back of panel. Horizontal Unit Bottom Panels: Fastened to unit with cam fasteners and hinge and attached with safety chain.
 - c. Coil: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch (2.5 mm) and with manual air vent. Coils shall be rated for a minimum working pressure of 300 psig (2068 kPa) and a maximum entering water temperature of 275 deg F (135 deg C).
 - d. Filters shall be 30% 2" pleated throwaway type
 - e. Insulation: No fibrous insulation is permitted in the air stream.

- f. Drain Pans: Galvanized steel, with connection for drain. Drain pan shall have a removable plastic liner and be insulated with polystyrene. Drain pan shall be formed to slope from all directions to drain connection. Drain pan shall be provided with level sensor to shut down and alarm at DDC.
3. Installation: Furnish with diagnostics port for portable operator terminal on control panel. Provide isolated trapeze hangers on horizontal units. Provide vibration isolation on vertical units. Insure that sufficient clearance is provided for filter and motor servicing and that hanging method does not preclude access.
4. Accessories: Provide three complete sets of filters for each unit. Provide one additional set of belts. Provide temperature and pressure ports at each coil.
5. Electrical - Unit shall require single electrical connection. All wiring 120 volt and shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
6. Additional Notes: Provide temperature/pressure gauges ports on connections. Air velocities shall not exceed 500/600 FPM for cooling/heating coils. Drain pan shall be provided with level sensor in compliance with IBC 2003 to shut down and alarm at (LonWorks based) DDC.
7. Design Standard Web product page:
<http://www.commercial.carrier.com/>

D3010.20 Finned Radiation 15764 RADIATORS

1. Acceptable manufacturers: Rittling S-SP5, Engineered Air, Vulcan
2. Description:
 - a. Cabinet: Sloped top security enclosure with patterned 1/8" perforations for inlet and discharge. All exposed panels and accessory sections shall be a minimum of 12 gauge steel. All exposed fasteners shall be tamperproof torx or allen head screws.
 - b. Finish: Units shall be provided with a textured polyurethane powder finish applied to a minimum mil thickness of .25. Enclosure shall be finished in a bronze tone. Submit color chart for exact selection.
 - c. Coil: Copper tube, with mechanically bonded aluminum fins

spaced no closer than 0.1 inch and with manual air vent. Coils shall be rated for a minimum working pressure of 500 psig and a maximum entering water temperature of 275 deg F.

3. Installation: All fittings, valves traps, etc., shall be located inside the enclosure and serviceable through access doors. Provide drain and air vent at the lowest and highest points respectively. Provide isolation valves to service element.
4. Accessories: Provide factory access doors with allen head keylock. Do NOT provide damper controls on radiation.
5. Electrical:
6. Additional Notes: All temperature sensing devices shall be located within the enclosure and shielded from tampering from outside the casing. (The control valve shall be self-contained type, of AMETAL body, with sensor and actuator mounted on valve body with a vandal-proof cover. These valves shall be Regin-make or MNZ-make.)
7. Design Standard Web product page:
<http://www.hydro-air.net/rittling/products/enclosures/security.html>

D3010.21 Cabinet Unit Heater 15766 CABINET UNIT HEATER

1. Acceptable manufacturers: Rittling R type, Engineered Air, Vulcan
2. Description:
 - a. Configuration: Floor mounted units are to be fully recessed in new construction. Semi-recessed and surface mounting is permitted on in existing construction.
 - b. Cabinet: 14 gauge steel, with removable panels secured with tamperproof fasteners.
 - c. Finish: Units shall be provided with a textured polyurethane powder finish applied to a minimum mil thickness of .25.
 - d. Coil: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and with manual air vent. Coils shall be rated for a minimum working pressure of 300 psig and a maximum entering water temperature of 275 deg F.
 - e. Insulation: No fiberous insulation is permitted in the air stream.
3. Installation: Provide isolated trapeze hangers on horizontal units. Provide vibration isolation on vertical units. Insure that sufficient clearance is provided for filter and motor servicing and that hanging method does not preclude access.

4. Accessories: Provide security intake grille, tamperproof access door, and leveling legs (floor mounted units). Provide one additional set of belts
5. Electrical - Unit shall require single electrical connection. All wiring 120 volt and higher shall be run in EMT.
6. Additional Notes: Provide chain retainer for ceiling mounted units
7. Design Standard Web product page: <http://www.hydro-air.net>

D3010.22 Unit Heater 15767 PROPELLER UNIT HEATER

1. Acceptable manufacturers: Rittling HR type, Engineered Air, Vulcan
2. Description: 20 gauge steel cabinet , factory primed and top coat, copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch (2.5 mm). Coils shall be rated for a minimum working pressure of 200 psig (2068 kPa) and a maximum entering water temperature of 275 deg F (135 deg C).
3. Installation: Provide vibration isolation on hangers and piping.
4. Accessories: Provide with fan guard and discharge louvers.
5. Electrical: Unit shall require single electrical connection.
6. Additional Notes: Install with room thermostat to cycle fan-operation and an aqua-stat to limit fan operation below set-point.
7. Design Standard Web product page: <http://www.hydro-air.net>

D3010.19 Classroom Unit Ventilators 15768 UNIT VENTILATORS

1. Acceptable manufacturers: Carrier, Magicaire, American Air Filter
2. Description:
 - a. Configuration: Draw-thru coil with face and bypass damper control. Units shall be designed for 100% economizer operation with exhaustor box.
 - b. Cabinet: All exposed panels shall be a minimum of 14 gauge steel. Frame shall be fabricated of minimum 12 gauge steel.

No plastic components shall be permitted on the exterior cabinet. All exposed fasteners shall be tamperproof torx or allen head screws. Discharge grille shall be welded steel with pencil-proof blades spaced no further than 0.23" apart. Grille shall be removable. Screens of 0.10 wire on 1/4" centers shall be provided on fan discharges behind bar grille.

- c. Finish: Units shall be provided with a textured polyurethane powder finish applied to a minimum mil thickness of .25. Unit top shall be finished in a dark bronze tone. End and front panels shall be tan. Submit color chart for exact selection.
 - d. Coil: Dual coil dual circuit piping shall be provided on heating/cooling units. Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and with manual air vent. Coils shall be rated for a minimum working pressure of 500 psig and a maximum entering water temperature of 275 deg F. Maximum air flow rates 500 FPM cooling, 600 FPM heating.
 - e. Fans: Motors shall be secured with bayonet mounting bracket. Fan shaft shall have accessible bearings and oil cups at each end. Motors shall be three speed high static units. ECM motors are not acceptable.
 - f. Dampers: Outside air dampers shall be galvanized steel with gasketed blades. Face and bypass dampers shall be constructed of aluminum.
 - g. Insulation: No fibrous insulation is permitted in the air stream.
 - h. Drain Pans: Galvanized steel, with connection for drain. Drain pan shall be fully insulated and furnished with drain connections at both ends. Drain pan shall be provided with level sensor in compliance with IBC 2003 to shut down and alarm at (LonWorks based) DDC.
3. Installation: Furnish with diagnostics port for portable operator terminal on control panel. Controls are, LonWorks based, to be factory installed and wired for final connection (note: controls are not to be provided by the unit manufacturer). All onboard temperature sensors shall be secured inside unit cabinet and shielded from tampering from the exterior of the unit. All units are to be piped to provide for isolation of coils. Install units with factory recommended clearances for service and maintenance.
4. Accessories: Furnish with storm-proof 6063-T5 aluminum intake louver with protective lattice faced grille. All exposed fasteners shall be tamperproof torx or allen head screws. Provide with three complete sets of filters for each unit. Provide 10% spare blower motors, and 50% spare bearings.

5. Electrical - Unit shall require single electrical connection. All wiring 120 volt and higher be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
6. Additional Notes: Units shall be selected for operation at the middle fan speed setting. Provide temperature/pressure gauges ports on connections. Furnish with exhaustor boxes or other relief system incorporated into design. Self contained units are NOT permitted. Unit sound performance on medium speed shall not exceed 36 dba in the 500, 1000, and 2000 frequency bands. Utilize multiple units if required to comply with sound levels criteria.
7. Design Standard Web product page:
<http://www.magicaire.com/aHorVer.pdf>

D3010.20
ENERGY

Heat Recovery Units

15785 PACKAGE AIR-TO-AIR

RECOVERY UNITS

1. Acceptable manufacturers: SEMCO Incorporated, Des Champs, Greenheck, Venmar Ventilation Inc.
2. Description
 - a. Configuration: Draw-thru coil with hydronic or DX cooling (where provided), and hydronic or indirect fired heating.
 - b. Casing: Wall and roof panels shall consist of 2" thick dual wall 18 gauge galvanized solid exterior skins and 22 gauge galvanized steel solid interior skins enclosing 2 inch thick 3 pcf mineral wool insulation. The housing shall be supported by a painted structural steel base. The base includes a solid welded floor with 6" thick mineral wool insulation. The bottom face of the insulation shall be protected with a 22 gauge galvanized steel cover. Outdoor air intake and exhaust air discharge openings shall have galvanized steel sheet metal hoods with openings covered with bird screen.
 - c. Fan section: Fans shall be centrifugal plenum type. The wheels shall be non-overloading type. The blades shall be securely welded, die-formed backward curved (16" and smaller) or airfoil (18" and larger) type. Fans shall have AMCA class rating for the capacity indicated. Fan wheels and shafts shall be selected with a maximum rated fan speed 25% below the first critical.
 - d. Mounting: Fan scroll, wheel, shaft, bearings, drives and motor shall be mounted on common base assembly. The base assembly shall be isolated from the outer casing on factory installed springs and vibration absorbent fabric on the scroll. Canvas style duct connections are NOT acceptable.

- e. Bearings shall be provided with extended grease fittings. Bearings shall be rated for 200,000 hours. Drive shall be designed for 2.0 service factor.
- f. Drain pan shall be double wall insulated stainless steel construction. Drain connection shall be 1-1/4" MPT and insulated from the point of connection to the pan to point at which it exits the casing.
- g. Access doors shall be equipped with two (2) cam lock non-removable handles per door and furnished on the following sections: Coil (access section), fan, filter, and wheel.
- h. Filter: Pre-filter section shall be 30% 2" pleated throwaway type. Secondary filter shall be mounted in the same filter frames as the pre-filters and be 12" deep, high performance filters. The media shall have an average efficiency of 65 percent. The filter shall be listed as UL class 2.
- i. Marine lights shall be furnished on any accessible sections 5'-0" or higher. Lights shall be wired to an external waterproof switch.
- g. Water Coil Sections: Individual, insulated, galvanized-steel casings for heating and cooling coils. Design and construct to facilitate removal and replacement of coil for maintenance and to ensure full airflow through coils. Self-draining coil fabricated according to ARI 410. Tubes/Fins: Copper/Aluminum with fin spacing 0.125. Headers: Cast iron with drain and air vent tappings. Frames: Galvanized-steel channel frame, 0.079 inch. Ratings: Design tested and rated according to ASHRAE 33 and ARI 410. Working-Pressure Ratings: 200 psig, 325 deg F.
- h. Outside Coil Fan: Propeller type, directly driven by motor.
- i. Refrigerant Coils: Aluminum-plate fin and seamless copper tube in steel casing with equalizing-type vertical distributor.
- j. Compressor: Hermetic scroll compressor with integral vibration isolators, internal over-current and over-temperature protection, internal pressure relief, and crankcase heater.
- k. Heat Exchanger: All stainless-steel construction (aluminized steel is NOT acceptable) for natural gas-fired burners with the following controls:
 - (1) Redundant dual gas valve with manual shutoff.
 - (2) Direct-spark pilot ignition.
 - (3) Electronic flame sensor.
 - (4) Induced-draft blower.
 - (5) Flame rollout switch.
- l. Enthalpy recovery wheel - The rotor media shall be made of aluminum coated to prohibit corrosion. Media surfaces shall be coated with adsorbent prior to being formed. Both faces of the energy recovery wheel shall be covered and sealed with a two part polymer coating for chemical resistance. Desiccant shall utilize a 3A molecular sieve certified by the manufacturer which limits adsorption to materials not

larger than the critical diameter of a water molecule (2.8 angstroms). The media shall be cleanable with low pressure steam (less than 5 PSI), hot water or light detergent, without degrading the latent recovery. Dry particles up to 800 microns shall pass freely through the media. The unit shall be provided with a factory set, field adjustable purge sector to limit cross contamination to < .04 percent of exhaust air stream. Rotor shall be supplied with labyrinth seals, which at no time shall make contact with any rotating surface of the exchanger rotor face. These seals shall utilize four labyrinth stages for optimum performance. The rotor media shall be provided in segments to allow for field erection or replacement. The rotor housing shall be a structural framework which limits the deflection due to air pressure loss to less than 1/32".

3. Installation: Provide dunnage, roof curbs and flashing required for installation. Provide condensate piping to roof drains. Install stand-alone control module providing link between unit controls and (LonWorks based) DDC system. Install units with factory recommended clearances for service and maintenance.
4. Accessories: Furnish with diagnostics port for portable operator terminal on control panel. Provide temperature and pressure gauges at each coil. Provide factory installed disconnect switch and convenience outlet. Provide three complete sets of filters for each unit. Provide one additional set of belts. Provide piping compartment if piped thru curb (exposed piping above roof is not permitted). Provide wafer type flow meter ring for use with portable flow meter on chilled and heating water inlet.
5. Electrical - Unit shall require single electrical connection the main electrical panel. The electrical panel shall be NEMA 12 rated. Electrical panels shall bear an ETL label. All wiring 120 volt and higher shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
6. Additional Notes: Coil velocities not to exceed 500 fpm for cooling and 600 fpm for heating.
7. Design Standard Web product page: <http://www.semcoinc.com/>

D3010.21 Ductwork 15815 METAL DUCTS

1. Acceptable manufacturers:
 - a. Fabricated Ducts: none
 - b. Prefabricated Round and Flat Oval Ducts: United McGill,

SEMCO, or approved equal

2. Description:

- a. Fabricated Ducts: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" and complying with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals. All duct systems shall be designed to a minimum SMACNA standard 2"w.g. seal class "B". Utilize galvanized steel except where noted. Comply with ASHRAE 62.1- 2004?
- b. Prefabricated Round and Flat Oval Ducts: Ducts, elbows, transitions, offsets, branch connections, shall comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" and with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals. All duct systems shall be designed to a minimum SMACNA standard 2"w.g. seal class "B". Utilize galvanized steel except where noted. Duct and components shall be fabricated with standing seams (longitudinal seams are NOT permitted). Ducts shall be factory cleaned and factory primed for field painting. Double wall ducts shall utilize solid interior wall construction (perforated inner wall is NOT permitted).

3. Installation:

- a. Construct and install ducts according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.
- b. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions.
- c. Electrical Equipment Spaces: Ducts not servicing transformer vaults and electrical equipment spaces and enclosures shall not be permitted in the aforementioned areas.
- d. Paint interiors of metal ducts, for 24 inches upstream of registers and grilles. Apply one coat of flat, black, latex finish coat over a compatible galvanized-steel primer.
- e. Seal duct seams and joints according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for duct pressure class indicated. Seal ducts before external insulation is applied.
- f. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection. Support vertical ducts at maximum intervals of 16 feet and at each floor. All

- insulation shall be protected from hanger damage via shields.
- g. All exposed duct insulation in mechanical rooms shall be rigid.
 - h. Flexible duct shall NOT be permitted on any negative pressure duct systems; exhaust, return, etc. Use of flexible ductwork is not desirable provide rigid metal connection where ever possible. Flexible ductwork (when approved) shall be secured to mains, trunks, diffusers etc. with stainless steel worm drive hose clamps (NO duct tape or tye-wrap shall be permitted).
 - i. Use of exposed ductwork shall be minimized. Exposed ductwork shall be a minimum 16 gauge and installed as to not permit the collection of trash and debris on top.
4. Leak Testing: Perform the field tests and inspections according to SMACNA's "HVAC Air Duct Leakage Test Manual" and prepare test reports. Maximum permissible leakage limited to 15%.
5. Cleaning New and Existing Systems:
- a. Clean the following metal duct systems by removing surface contaminants and deposits:
 - 1.) Air outlets and inlets (registers, grilles, and diffusers).
 - 2.) Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
 - 3.) Air-handling unit internal surfaces and components including mixing box, coil section, condensate drain pans, filters and filter sections, and drains.
 - 4.) Coils and related components.
 - 5.) Return-air ducts, dampers, and actuators except in ceiling plenums and mechanical equipment rooms.
 - 6.) Supply-air ducts, dampers, actuators, and turning vanes.
6. Mechanical Cleaning Methodology:
- a. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
 - b. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
 - c. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct

- liner, or duct accessories.
 - d. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
 - e. Biocidal Agents and Coatings: Apply biocidal agents if fungus is present. Apply biocidal agents according to manufacturer's written instructions after removal of surface deposits and debris
 - f. Replace fire damper links damaged or failed prior to cleaning
7. Cleanliness Verification: Visually inspect metal ducts for contaminants re-clean and re-inspect ducts where contaminants are discovered. Provide test report. Comply with ASHRAE/IESNA 62.1- 2004, section 7.2.4?
8. Accessories:
9. Additional Notes:
- a. All ducts shall be galvanized steel except as follows:
 - 1.) Range Hood Exhaust Ducts: Comply with NFPA 96.
 - 1) Concealed: Carbon-steel sheet.
 - 2) Exposed: 18 gauge, Type 304, stainless steel with finish to match kitchen equipment and range hood.
 - 3) Weld and flange seams and joints.
 - 2.) Dishwasher Hood Exhaust Ducts:
 - a.) 18 gauge, Type 304, stainless steel with finish to match kitchen equipment and range hood. Weld and flange seams and joints.
 - b.) Aluminum, with seams and laps arranged on top of duct.
 - 3.) Laboratory Fume Hood Ducts:
 - a.) Exposed: 18 gauge, Type 316, stainless steel
 - b.) Weld and flange seams and joints.
 - b. Non rigid fabric type ducts are NOT permitted. NO internally lined ductwork will be permitted.
 - c. All ductwork shall meet ANSI S12.60-2002 Acoustical Performance Criteria, Design Requirements and Guidelines for Schools.
10. Design Standard Web product page: <http://www.mcgillairflow.com/>

1. Acceptable manufacturers:

- a. Backdraft Dampers: Ruskin Co., CESCO Products, Inc., Vent Products Co
- b. Volume dampers: Ruskin Co., Air Balance, Inc., Vent Products Co.
- c. Motorized control dampers: Ruskin Co., Air Balance, Inc., Vent Products Co.
- d. Fire dampers: Ruskin Co., Prefco Products, Inc., Vent Products Co.
- e. Smoke and Combination fire & smoke dampers: Ruskin Co., CESCO Products, Nailor Industries Inc.
- f. Duct silencers: Ruskin Co., Industrial Noise Control Inc., Vibro-Acoustics
- g. Turning vanes: Ductmate Industries, Inc., Duro Dyne Corp., METALAIRE, Inc.
- h. Duct-mounting access doors: Ductmate Industries, Inc., CESCO Products, McGill AirFlow Corp.
- i. Flexible connectors: Duro Dyne Corp., Ventfabrics, Inc., Ward Industries, Inc.

2. Description:

- a. Backdraft Dampers: Multiple-blade, parallel action gravity balanced, center-pivoted blades, maximum 6-inch width, with sealed edges, 90-degree stop, steel ball bearings, and axles; adjustment device to permit setting for varying differential static pressure.
- b. Volume dampers: Factory fabricated, with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration.
- c. Motorized control dampers: AMCA-rated, opposed-blade design; minimum of 0.1084-inch thick, galvanized-steel frames; minimum of 0.0635-inch thick, galvanized-steel damper blades with maximum blade width of 8 inches. Provide closed-cell neoprene edging opposed-blade design with inflatable seal blade edging, rated for leakage at less than 10 cfm per sq. ft. of damper area, at differential pressure of 4-inch wg when damper is being held by torque of 50 in. x lbf; when tested according to AMCA 500D.
- e. Fire dampers: Curtain type with low profile blades inside air-stream, multiple-blade type; fabricated with roll-formed, 0.034-inch thick galvanized steel; with mitered and interlocking corners, replaceable fusible links

- f. Smoke and Combination fire & smoke dampers: Mounting Sleeve – factory installed, 0.052-inch thick, galvanized, Frame and blades - 0.064-inch thick, galvanized, Damper Motors - permanent-split-capacitor motors (shaded pole NOT permitted), Spring-Return Motors - equip with an integral spiral-spring mechanism, enclose entire spring mechanism in a removable housing designed for service or adjustments, Electrical connection - Electric 24V, 60 Hz, two-position, fail close.
 - g. Duct silencers: Outer Casings - ASTM A 653/A 653M, G60, spiral lock-seam galvanized sheet steel, Interior Casing - ASTM A 653/A 653M, G60, galvanized sheet steel, silencers shall be fiber-FREE.
 - h. Turning vanes: Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for vanes and vane runners.
 - i. Duct-mounting access doors: Fabricate doors airtight and suitable for duct pressure class. Door: Double wall, duct mounting, and rectangular; fabricated of galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class. Provide largest acceptable door for applicable duct. Indicate location on plans and coordinate access with interferences.
 - Less than 12" square: Secure with two sash locks.
 - Greater than 12 inches provide hinge and sash locks.
 - j. Flexible connectors: Indoors - Glass fabric double coated with neoprene. Outdoors - Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.
3. Installation: Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards-Metal and Flexible" for metal ducts. Provide duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- a. Install back-draft dampers on exhaust ducts nearest to exhaust termination and where indicated.
 - b. Install volume dampers in ducts on all supply air terminals. Provide balancing dampers at points on supply, return, and exhaust systems where branches lead from larger ducts as required for air balancing. Install at a minimum of two duct widths from branch takeoff.
 - c. Install fire and smoke dampers, with fusible links, according to manufacturer's UL-approved written instructions.

d. Install duct access doors to allow for inspecting, adjusting, and maintaining accessories and terminal units as follows:

- 1.) On both sides of duct coils.
- 2.) Adjacent to fire and smoke dampers, to providing access dampers and fusible links.

e. Install flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.

4. Accessories: Provide 25% additional fusible links, provide one additional smoke damper motor per 15 smoke dampers.
5. Electrical: Damper motors shall be 24V 60 Hz
6. Additional Notes: Fire and Fire Smoke damper installations shall comply with UL555 requirements
7. Design Standard Web product page:
 - a. Back draft dampers: <http://www.ruskin.com>
 - b. Volume dampers: <http://www.ruskin.com>
 - c. Motorized control dampers: <http://www.ruskin.com>
 - d. Fire dampers: <http://www.ruskin.com>
 - e. Smoke and combination fire & smoke dampers: <http://www.ruskin.com>
 - f. Duct silencers: <http://www.ruskin.com>
 - g. Turning vanes: <http://www.ductmate.com/>
 - h. Duct-mounting access doors: <http://www.ductmate.com/>
 - i. Flexible connectors: <http://www.durodyne.com>

D3010.23 Utility Sets 15837 CENTRIFUGAL FANS

1. Acceptable manufacturers: Loren Cook, JennFan, Carnes, Greenheck, Penn Ventilator
2. Description: Belt-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, and accessories.
 - a. Housing: Fabricated of galvanized steel with side sheets fastened with a deep lock seam or welded to scroll sheets
 - b. Fan Wheels: Single-width, single inlet; welded to cast-iron or cast-steel hub and spun-steel inlet cone, with hub keyed to shaft.

- c. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
 - d. Shaft Bearings: Pre-lubricated and sealed, self-aligning, pillow-block-type ball bearings with ABMA 9, L₅₀ of 200,000 hours.
 - e. Belt Drives: Factory mounted, with final alignment and belt adjustment made after installation.
 - f. Service Factor Based on Fan Motor: 1.5
 - g. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with motors larger than 5 hp. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
 - h. Belts: Oil resistant, non-sparking, and non-static; matched sets for multiple belt drives.
 - i. Belt Guards: Fabricate of steel for motors mounted on outside of fan cabinet.
3. Installation: Provide vibration isolation on hangers and duct connections. Install floor-mounting units on concrete bases. Roof mounted units shall be installed on full curbs. Install units with factory recommended clearances for service and maintenance.
4. Accessories:
- a. Scroll Access Doors: Shaped to conform to scroll, with quick-opening latches and gaskets.
 - b. Companion Flanges: Galvanized steel, for duct connections.
 - c. Inlet Screens: Removable galvanized steel welded grid screen.
 - d. Scroll Drain Connection: NPS 1 (DN 25) steel pipe coupling welded to low point of fan scroll.
 - e. Damper: Counterbalanced, parallel-blade, backdraft dampers mounted in fan discharge; factory set to close when fan stops.
 - f. Weather cover and roof curb factory furnished where required.
5. Electrical: All wiring 120 volt and higher shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
6. Additional Notes:
7. Design Standard Web product page: <http://www.lorencook.com/>

D3010.24 Centrifugal Roof Ventilators 15837 CENTRIFUGAL FANS

- 1. Acceptable manufacturers: Loren Cook, JennFan, Carnes, Penn Ventilator, Greenheck
- 2. Description: Belt-driven or direct-driven centrifugal fans consisting of

housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories.

- a. Housing: Removable, spun-aluminum, dome top and outlet baffle, square, one-piece, aluminum base with venturi inlet cone.
 - 1) Up blast Units: Provide spun-aluminum discharge baffle to direct discharge air upward, with rain and
 - b. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.
 - c. Belt-Driven Drive Assembly: Resiliently mounted to housing
 - d. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
 - e. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
 - f. Pulleys: Cast-iron, adjustable-pitch motor pulley
 - g. Fan and motor isolated from exhaust air-stream.
3. Installation: Provide vibration isolation on duct connections. Roof mounted units shall be installed on factory curbs. Install units with factory recommended clearances for service and maintenance.
4. Accessories:
- a. Roof curb galvanized steel; mitered and welded corners; 1-1/2-inch-thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Self-flashing with built-in raised cant and mounting flange. Overall height: 18" with intergral backdraft damper
 - b. Bird Screens: Removable, 1/2-inch mesh
 - c. Variable-Speed Controller: Direct drive motors only.
 - d. Disconnect Switch: Non-fusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
5. Electrical: All wiring 120 volt and higher shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
6. Additional Notes:
7. Design Standard Web product page: <http://www.lorencook.com/>

D3010.25 Cabinet Fans 15837 CENTRIFUGAL FANS

1. Acceptable manufacturers: Loren Cook, JennFan, Carnes, Greenheck

2. Description: Centrifugal fans designed for installing in ceiling or wall or for concealed in-line applications. Steel housing with lined with acoustical insulation. Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.
3. Installation: Provide vibration isolation on duct connections. Install units with factory recommended clearances for service and maintenance.
4. Accessories:
 - a. Variable-Speed Controller: Direct drive motors only.
 - b. Isolation: Rubber-in-shear vibration isolators.
 - c. Manufacturer's standard roof jack or wall cap, and transition fittings.
5. Disconnect Switch: Non-fusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
6. Electrical: All wiring 120 volt and higher shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box. Provide junction box for electrical connection on housing.
7. Additional Notes: Exhaust fans shall be mounted Use ceiling grille type specified elsewhere not fan manufacturer's grille.
8. Design Standard Web product page: <http://www.lorencook.com/>

D3010.26 In-Line Centrifugal Fans 15837 CENTRIFUGAL FANS

1. Acceptable manufacturers: Loren Cook, JennFan, Carnes, Greenheck
2. Description: In-line, belt-driven centrifugal fans consisting of housing, wheel, outlet guide vanes, fan shaft, bearings, motor and disconnect switch, drive assembly, mounting brackets, and accessories.
 - a. Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.
 - b. Direct-Driven Units: Motor encased in housing outside of air-stream, factory wired to disconnect switch located on outside of fan housing.
 - c. Belt-Driven Units: Motor mounted on adjustable base, with adjustable sheaves, enclosure around belts within fan housing,

- and lubricating tubes from fan bearings extended to outside of fan housing.
- d. Fan Wheels: Aluminum, airfoil blades welded to aluminum hub.
3. Installation: Provide vibration isolation on duct connections. Install units with factory recommended clearances for service and maintenance.
 4. Accessories:
 - a. Companion flanges with flex connectors.
 - b. Volume-Control Damper: Manually operated with quadrant lock, located in fan outlet.
 - c. Fan Guards: 1/2- by 1-inch mesh of galvanized steel in removable frame for units not connected to ductwork.
 - c. Access doors for units with fans in air-stream
 - d. Belt guards
 5. Electrical: All wiring 120 volt and higher shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box. Provide junction box for electrical connection on housing.
 6. Additional Notes:
 7. Design Standard Web product page: <http://www.lorencook.com/>

D3010.27 Propeller Fans 15836 AXIAL FANS

1. Acceptable manufacturers: Loren Cook, JennFan, Carnes, Greenheck
2. Description: Belt-driven or direct-driven propeller fans consisting of fan blades, hub, housing, orifice ring, motor, drive assembly, and accessories.
 - a. Housing: Galvanized steel sheet with flanged edges and integral orifice ring with baked-enamel finish coat applied after assembly.
 - b. Steel Fan Wheels: Formed-steel blades riveted to heavy-gage steel spider bolted to cast-iron hub.
 - c. Fan Wheel: Replaceable, cast-aluminum, airfoil blades fastened to cast-aluminum hub; factory set pitch angle of blades.
 - d. Belt-Driven Drive Assembly: Resiliently mounted to housing, statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower,

with final alignment and belt adjustment made after installation.

3. Installation: Provide vibration isolation on duct connections. Install units with factory recommended clearances for service and maintenance.
4. Accessories:
 - a. Gravity Shutters: Aluminum blades in aluminum frame; interlocked blades with nylon bearings.
 - b. Motor-Side Back Guard: Galvanized steel, complying with OSHA specifications
 - c. Wall Sleeve: Galvanized steel to match fan and accessory size.
 - d. Variable-Speed Controller: For direct drive motors.
5. Electrical: All wiring 120 volt and higher shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box. Provide junction box for electrical connection on housing.
6. Additional Notes:
7. Design Standard Web product page: <http://www.lorencook.com/>

D3010.28 Diffusers Registers and Grilles 15855 DIFFUSERS, REGISTERS AND GRILLES

1. Acceptable manufacturers:
 - a. Adjustable Bar Grille or Register: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
 - b. Security Grille or Register: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
 - c. Fixed Face Grille or Register: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
 - d. Linear Bar Grille or Register: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
 - e. Linear Slot Diffuser: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
 - f. Louver Face Diffuser Square Ceiling Diffusers: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
 - g. Perforated Diffuser Ceiling Diffusers: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
2. Description:
 - a. Adjustable Bar Grille or Register:
 - 1) Material: Steel or Aluminum.

- 2) Finish: Baked enamel, color selected by Architect.
 - 3) Face Blade Arrangement: Adjustable horizontal, Adjustable vertical, Concealed tamperproof blade gang operator.
 - 4) Frame: 1-1/4 inches wide.
 - 5) Mounting: Countersunk tamperproof fasteners.
 - 6) Damper Type: Adjustable opposed-blade assembly.
- b. Security Grille or Register: METALAIRES, Inc., Price Industries, Tuttle & Bailey
- 1) Material: Steel.
 - 2) Finish: Baked enamel, color selected by Architect.
 - 3) Face Arrangement: 3/16-inch thick front lattice plate with 1-by-1 inch square holes and 1/2-inch frets, 0.135-inch wire mesh, and 1/4-inch thick backer plate.
 - 4) Frame: 1-1/4 inches wide mounting and countersunk tamperproof fasteners.
 - 6) Damper Type: Adjustable opposed-blade assembly.
- c. Fixed Face Grille or Register: METALAIRES, Inc., Price Industries, Tuttle & Bailey.
- 1) Material: Steel or Aluminum.
 - 2) Finish: Baked enamel, color selected by Architect.
 - 3) Face Arrangement: 1/2-by-1/2-by-1/2-inch grid core.
 - 4) Frame: 1-1/4 inches wide.
 - 5) Mounting: Countersunk tamperproof fasteners.
 - 6) Damper Type: Adjustable opposed-blade assembly.
- d. Linear Slot Diffuser: METALAIRES, Inc., Price Industries, Tuttle & Bailey.
- 1) Material: Steel or Aluminum.
 - 2) Finish: Baked enamel, color selected by Architect.
 - 3) Core Spacing Arrangement: 1/8-inch thick blades spaced 1/4 to 1/2 inch apart, 15 degree deflection. One Or Two-Way Deflection Vanes: Extruded construction fixed louvers with removable core.
 - 4) Frame: 1-1/4 inches wide.
 - 5) Mounting: Countersunk tamperproof fasteners.
 - 6) Damper Type: Adjustable opposed-blade assembly.
- e. Louver Face Diffuser Square Ceiling Diffusers: METALAIRES, Inc., Price Industries, Tuttle & Bailey.
- 1) Material: Steel or Aluminum.
 - 2) Finish: Baked enamel, color selected by Architect.
 - 3) Face Size: 24 by 24, 12 by 12 inches.
 - 4) Face Blade Arrangement: One, Two, Three or Four way fixed blades.

- 5) Mounting: Surface, T-bar, Snap in, or Spline.
- 6) Damper Type: Butterfly.

f. Perforated Diffuser Ceiling Diffusers: METALAIRE, Inc., Price Industries, Tuttle & Bailey.

- 1) Material: Steel or Aluminum.
- 2) Finish: Baked enamel, color selected by Architect.
- 3) Face Size: 24 by 24, 12 by 12 inches.
- 4) Pattern Controller: Adjustable with louvered pattern modules at inlet
- 5) Mounting: Surface, T-bar, Snap in, or Spline.
- 6) Damper Type: Butterfly.

3. Installation: Indicate flow direction on ceiling diffusers. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

4. Accessories:

5. Electrical:

6. Additional Notes: Select diffusers registers and grilles to meet ANSI S12.60-2002 Acoustical Performance Criteria, Design Requirements and Guidelines for Schools. Devices shall be selected with a catalog Noise Criteria (NC) rating of NC18 or less. All air terminal devices used in public areas are to be steel construction, heavy grade material. Non-public areas shall utilize heavy grade aluminum grilles. All air terminal devices are to be installed a minimum 8'-0" above the finished floor.

7. Design Standard Web product page: <http://www.metalaire.com/>

D3010.29 Direct Digital Control Systems 15836 AXIAL FANS (this is out of place)

1. Acceptable manufacturers: TAC, Honeywell, Johnson (Not acceptable), Siemens
2. Description: This section is in development due to modifications to incorporate BAS functions. The controls will be LonWorks based with LonMark certified controllers with peer-to-peer communication LonTalk bus. All the controllers will be truly open protocol type (as that of TAC-make), of modular design, standalone, and will not need battery back-up.
3. All Echelon/LonMark controllers shall possess interoperable software to allow easy communication, and information sharing to

Echelon/LonMark controllers manufactured by various other vendors. Any attempts to provide equipment containing proprietary software that does not allow for a free transfer of information between other vendors' equipment and software will be deemed as non-compliant to the intent of specification.

4. Portable Operator-panel (keypad): It can be mounted on the controller for local access and also can be carried with and used as a hand-held remote portable terminal. This operator-panel can be plugged in to the jack terminal via 6 feet long flexible cable for access to all system parameters. It shall have minimum six keys on keypad and an LCD alphanumeric display with 4 x 20 characters, to give access to the parameters, to list alarms, to monitor status, to adjust set-points and time-channels and to provide start/stops. All explanatory text to be preferably in upper class letter format, in English. A flashing signal, such as asterisk or light, shall indicate occurrence of alarm. Alarms will be programmed for failure of equipment, valves, and dampers as well as for high/low temperatures. The size of the operator-panel shall be 6" x 4". It shall have a protective gasketed transparent cover. It shall have a minimum of three levels of access, to be programmed as follow.

Level 1 - View all times, temperatures and set-points.

Level 2 - Modify all system parameters.

Level 3 - Modify other system parameters and change access level for system interrogation.

Levels 2 & 3 are to be protected by a password of a four digits number.

Menu on panel (when plugged in to terminal jack) shall be thus:

Calling status on each Boiler, Chiller and each Zone.

For each Calling status, typical menus shall run for each of items listed as follow:

- a. Service/Parts
- b. Temperatures
- c. Setpoints
- d. Alarms
- e. Time Schedule (week and holidays)
- f. Date and Time
- g. Access code

5. Controllers: Modular, comprising programmable processor board containing neuron chip, with fully job specific software tested and simulated for 4 hours of occupied and 4 hours of unoccupied operation; local operator access; integral interface equipment. Capable to operate on either 24V AC, 60 Hz or DC +/- 20% sources with maximum power consumption of 5 W. It shall be capable of receiving signals from industrial grade sensors and transducers. It shall have

non volatile flash memory so the unit will start up with user settings and work normally after a power failure.

- a. Controllers to monitor or control each input/output point; process information; execute commands from other control units, devices, and operator stations; and download from or upload to operator station.
- b. Electronics part to be separate from the terminal board and the mounting base. All field/panel wires to terminate at the terminal board. Electronics part is removable for service simply by plugging out/in the electronics board without affecting the terminal connections. Controllers shall have completely enclosed electronic circuit boards to protect from VOC contaminants.
- c. Controller shall not need battery back-up to protect user settings. It shall start up with user settings and work normally (upon resuming power) after a power failure. A built-in capacitor shall maintain operation of the real-time clock for at least 72 hours in event of a power failure.
- d. Stand-alone mode control functions operate regardless of network status. Functions include the following:
 1. Global communications.
 2. Discrete/digital, analog, and pulse input/output.
 3. Monitoring, controlling, or addressing data points.
 4. Weekly time channels and holidays channels. Separate time periods in each weekly time channel for each day of the week, including weekends. Holiday programs incorporate use of wild cards in the start and stop dates to define certain holidays (such as 4th of July, Thanksgiving Day, Christmas Day) so they will index setback every year. All time channels to be saved in control unit's flash memory. Programming Application features to include trend point, alarm messages, weekly scheduling, and interlocking.
 5. Handle alarm conditions detected via the digital or the analog inputs. An analog input signal can be compared with preset hi/lo limits resulting in an alarm if outside the limits. User definable time delays prevent false alarms. Alarms are to be stacked.
 6. Provide control curve characteristics. Curves to incorporate breakpoints so reset capabilities are not straight line functions.
 7. Provide optimization programs for both occupied/unoccupied operations for all the seasons.
 8. Provide reset controls during both occupied and unoccupied periods for temperatures as specified.

9. Testing and developing control algorithms without disrupting field hardware and controlled environment.
 - e. Local operator interface to provide for download from or upload to portable operator's panel.
6. LonTalk Conformance: Based with Echelon LonWorks FTT-10 topology, 78 kbps. Communication trunks that have separate in/out connections and/or with polarized in/out connections are not acceptable. Peer line connection shall be flexible, offering simple bus, multi-drop, daisy chain or ring installation or a combination of all. It shall have minimum capabilities defined in PICS for the following areas:
 - a. Network.
 - b. Functional groups.
 - c. Standard application services supported.
 - e. Standard objects supported.
7. Each controller shall be capable to communicate between nodes from different manufacturers to process information for readout/control. A list of SNVTs (Standard Network Variable Types) to be available for integrating into the functions. Controller not capable of defining SNVTs is not acceptable.
8. Modem capability via RS-232 connection to view/alter program. Controller requiring additional boards or other hardware to accomplish this is not acceptable.
9. Each controller shall be capable of performing its assigned local loop control and other functions as a stand-alone unit. It will have peer-to-peer networking capability with controllers, sensors, thermostats, and actuators, to exchange information on a global basis via a two-wire non-polarized trunk cable.
10. Each controller shall have an integral port for connection of an operator's keypad. A simple plug-in connection of keypad will allow the operator to use the information on display in the network. Control unit having keypad(s) as an integral part is not acceptable. Keypads shall be flexible and can be installed anywhere on the network trunk and used as an operator interface device for monitoring, alarming and set-point changes.
11. Controller -Software Requirement: The control unit shall have "canned" software, as minimum, described as follow. The control unit not meeting these software requirements will not be acceptable.
 - a. Optimized start/Stop programs with cut off during high/low outdoor air temperature.

- b. Reset curves with selected breakpoints (minimum 4)
- c. Ramp functions to filter the input signals and increment the outputs for stability.
- d. Outdoor air signal dampening. (Instantaneous sensing for reset is not acceptable).
- e. Sequencing of load identifying number of stages, rotating of stages, delay period between stages and hysteresis of stages.
- f. P, PI, PID control algorithms.
- g. Delay programs for digital outputs, program cycles with adjustable on/off times.
- h. Alarm programs with adjustable on/off times and alarm text for readout. Alarms shall cause flashing alarm symbol to show which shall continue until acknowledged by the operator. The time and date is to be displayed for each alarm. Alarms are to be stacked and numbered.
- i. Allow all mathematical and logical functions in conjunction with real numbers, integer numbers or operator entered constants.
- j. Runtime measurements selectable either in seconds, minutes or hours. All over-rides shall be stored in a run time counter and displayed on the keypad under an access code. At selectable levels, any run-time measurement and alarm shall be indicated in English text with corrective action to take.
- k. Standard reading of digital inputs (alarms, pulse counting and interlocks).
- l. Control of digital outputs.
- m. Network support for connection to remote I/O modules.
- n. Fully automatic daylight savings time (DST) switching.
- o. Display, accumulate and total meter inputs, such as gas meter contacts, electric meters, flow meters, etc.

12. Application Software: Include the following:

- a. Input/output capability from operator station.
- b. Operator system access levels via software password.
- c. Database creation and support.
- d. Dynamic color graphic displays.
- e. Alarm processing.
- f. Event processing.
- g. Automatic restart of field equipment on restoration of power.
- h. Data collection.
- i. Graphic development on workstation.
- j. Maintenance management.

(12) CENTRAL PERSONAL COMPUTER (PC) SYSTEM

- A. The intent of this central PC system is to provide not only local monitoring/control capabilities in this school but also the same functionality

(i.e. monitoring/control) from any PC in the Philadelphia School District (PSD) that is presently tied into the districts Local Area Network (LAN). Only software based on LonWorks type products will be acceptable. Gateways/black boxes or BacNet type offerings are not acceptable. Modems are not acceptable.

- B. Licensed central system software to be integrated with PSD's Microsoft Windows ® NT security performed by a domain controller over PSD's existing LAN.
- C. System shall be able to e-mail all alarms to the maintenance department address or to any individuals designated by the Owner. Alarms will also be printed locally on the PC's printer. System shall be able to call cell phones to advise of an alarm condition within the building, if owner deems it necessary.
- D. The (standard) Personal Computer shall be able to run when located/relocated to any room/building (i.e. it does not have to be hardwired to building communication trunk). Central system shall be located where directed at any time, and at no cost, by the Owner.
- E. Computer software shall allow password access to Trainees that will only allow them to monitor points only (not controls/overrides). Night shift engineers shall have passwords that will allow their access to points as directed by the building engineer. Provide authority level adjustment of every point for each user. (i.e. unlimited).
- F. The system shall provide ongoing report of all logged on users and points that users overrode while logged in.
- G. The System can be monitored from any PC in this school, at any other school in PSD, or from the central office of PSD. Only criteria required for these PC's to run and be able to monitor shall be that they will be on PSD's LAN. For example, the Building Engineer can still control his building if he is visiting an annex and/or the main office. Maintenance staff can access the system for monitoring purposes only. Training department can access the system for different levels of employee training. (NOTE: Access level requirements below)
- H. Provide a dedicated central computer with a minimum of 50 GB hard drive, 128MB-RAM, 900MHZ, Windows NT operating system, internal modem, 19" monitor, dot matrix printer (2 boxes fan fold paper) or approved equal, MicroSoft Office (including Excel and Word) software, internal Lonworks network card (PCLTA-20/TP-1250 high speed backbone), and applicable DDC system software including but not limited to:

Time scheduling

Alarm handling
Color graphics
Trend logging
Historical data
Password Access
Field device communication
Dial-in remote communication
LonWorks communication

- I. Provide graphics for all AHUs, HVs/AC's, exhaust fans on roof, Cooling Tower, and the boiler room equipment such as boilers, chiller, combustion air louvers, exhaust fan, gas booster, and pumps. Bind the start/stop (occupied/unoccupied) times for the AHUs, HVs/AC's and cabinet unit heaters as applicable on an exposure basis i.e. north zone start first, west zone next, then south and last east exposure. Graphic for the AHUs, HVs/AC's shall show, as a minimum, (to avoid cluttering the graphic) the space temperature, set-point, current damper and valve positions, minimum outdoor air setting, mixed air temperature, fan-discharge temperature, fan start/stop, and status. Provide an override button for each AHU, AC/HV graphic to allow operator to select overtime usage without interrupting the normal time schedules. Along side the button shall be the timer so operator can select the amount of overtime use (adjustable 0.5 to 10 hrs.). A separate link button on each graphic shall allow operator to view and adjust the remainder of the controllers SNVT's. Owner can ask to add to the graphic picture any additional points they may deem necessary at no additional cost. The same shall hold true for the boiler room equipment graphics. Provide graphics for all reheat systems that are linked to their respective air-handlers.
- J. The central system shall contain the database so that it shall be able to import control wiring diagrams and equipment data sheets from the database. When any graphic is displayed, a click on any sensor, valve, actuator or any system component shall be able to bring up its associated data sheet. (NOTE: All system documentation shall reside in the computer and shall be displayed by clicking on that graphical object. Searching through multiple CD's for a piece of equipments information will not be acceptable.)
- K. Password access shall be provided for the building engineer so he can have full point accessibility/authority. All points shall be accessible by him for monitoring and controlling. Other passwords shall be assigned by this contractor in accordance to the Owner's needs. Trainees shall be given access on a monitoring basis only but have access to the override buttons on the AHUs, HVs/AC's. Training department and maintenance department shall have access levels that provide monitoring capabilities only. (NOTE: All central system log-in shall be recorded so operator can

view/track system usage.)

- L. All wiring for central system is to be provided by this contractor. Include necessary surge suppression as recommended by the manufacturer and approved by the Owner.

- M. Communication Devices: Provide,
 - 1. A high speed backbone channel (no less than 1250Kbps) on each floor, if needed, for connecting to the FT-10 field device network. Routers to be coactive type mounted in an enclosure to protect it from environmental temperature and humidity conditions and vandalism. All power supply and control wiring for device shall be provided by this contractor. Backbone and router wire to be echelon approved cable run in EMT conduit or wire mold, as applicable. Routers shall withstand +/- 20% tolerance on power supply. .
 - 2. Repeaters as necessary to amplify the signals on the FT-10 network. As a minimum provide one per floor. Repeaters to be mounted in an enclosure to protect it from environmental temperature and humidity conditions and vandalism. All power supply and control wiring for the devices shall be provided by this contractor. Repeaters shall withstand +/- 20% tolerance on power supply. Locate repeaters, as approved.

NUMBER	TITLE EXPLANATION	MF NUMBER
D 30	HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)	

D3000 Design Approach

1. Central Plant:

Design approach utilizes a central either heating only or combined heating/cooling plant, as determined and applicable. Boilers and chillers are sized and selected as indicated in School District Standards (SDS). Provide hot/chilled water, as applicable, to serve the various heat transfer devices throughout the building. Basement or grade level equipment room locations are preferred; however, penthouses may be accepted for central plant locations (review with District). Air cooled chillers (Evap. Cooled chillers preferred) in compliance with SDS may be considered. Four pipe systems, for combined heating/cooling, are preferred. Primary only piping systems with variable flow are to (can) be used in lieu of primary-secondary loops. Each piping loop shall be equipped with a primary and stand-by pump.

2. Ventilation:

Ventilation shall be in compliance with the IBC. Demand control ventilation (DCV) is to be applied to all air handling devices using outside air via CO₂ sensors to reduce outside air requirements. Motion sensors have proved problematic and are to be avoided.

3. Space Requirements:

- a. Classrooms and Office Areas: Classrooms are to be served by classroom unit ventilators (CUV). Office areas are to be served by fan coils (FC). CUV's and FC's are to be equipped with 100% economizers. (Economizer for CUV of 2000 CFM and larger). Larger CUV's shall be provided with exhaust boxes for 100% economizer operation. Minimum outdoor air shall be provided via centralized outdoor air heat recovery units equipped for DCV at the room level.
- b. Stairwells and Entrance Vestibules: Stairwells with exterior exposures and entrance vestibules are to be provided with convectors.
- c. Toilet Rooms: Toilet rooms with exterior exposures are to be provided with finned radiation only. In public toilet rooms wherever possible elevate the radiation to reduce physical abuse. In non-public toilet rooms install top of finned radiation thirty inches (30") above finished floor. Door undercuts are permissible, however door louvers are not. When CFM requirements exceed undercut capacity transfer grilles are to be used (ceiling mounting preferred).
- d. Assemble Areas: Large assembly areas such as auditorium, cafeteria, gymnasium and multipurpose rooms are to be served by constant volume

air handlers with DCV. Outside air shall be provided via heat recovery within the air handling device.

- e. Kitchen: Hood requirements for kitchen areas shall be developed through the Food Services Division of the School District. Freestanding hoods in lieu of wall mounted hoods are to be avoided. Washdown hoods are not acceptable. Makeup air for the kitchen shall be supplied to the space via ceiling mounted perforated registers, located away from the hood, NOT through the hood system. The make up air (equal to exhaust minus HVAC make-up air to kitchen) for hood shall be supplied through perforated perimeter make-up device.

4. Applicable Codes:

- a. 2003 International Mechanical Code
- b. ASHRAE
- c. SMACNA
- d. AMCA
- e. ASTM
- f. UL
- g. NFPA
- h. ANSI Noise Criteria

5. Design Conditions:

- a. Outdoor Conditions
 - Summer..... 93° F / 75° F db/wb
 - Winter..... 10°
 - Daily Range.....20° F
- b. Indoor Conditions
 - 1) Gymnasiums/Kitchens/Shops: Winter - 68° F, Summer - Ventilation Only
 - 2) Toilet Rooms: Winter - 70° F, Summer – Ventilation Only
 - 3) Shower Rooms/Drying Rooms/Natatoriums Winter - 70° F, Summer – Ventilation Only
 - 4) Auditoriums/Cafeterias/Classrooms/Offices: Winter - 70° F, Summer – 75° F 50%rh
 - 5) Mechanical Rooms: Winter - 68° F, Summer - Ventilation Only
 - 6) Remaining Areas: Winter - 70° F, Summer – 75° F 50%rh
 - 7) Occupant Heat Loads:

School Type	Sensib le	Laten t
Primary / Intermediate	230	120
Secondary	240	160
Administrative Areas	245	205

- c. Altitude 5'-0" ASL

- d. Latitude 40°

5. Emergency Systems:

- a. Chiller rooms are to be equipped with a code compliant purge exhaust and the necessary detectors. Minimum of sensors per refrigeration device are required. Provide annunciator both inside and at all points of entry to space and to the BAS.
- b. Boiler rooms are to be provided with CO₂ (or carbon monoxide) sensors (one per boiler) (one per room and not per boiler). Provide annunciator both inside and at all points of entry to space and to the BAS.
- c. Relief Vents and Rupture disks are to be piped the shortest distance to the exterior of the building and terminate above the roof.
- d. Emergency generators shall be sized to permit operation of the heating plant and air handling devices to support operation of the large assembly areas including the cafeteria, auditorium, gym and multipurpose rooms.

6. Thermal Efficiency: Per ASHRAE Guidelines

7. Space Temperature Control:

All space mounted temperature control devices shall be secured in lockable covers (temperature sensors to be thermistor type with stainless steel plate flush mounted to the wall) and provided in accordance with the following:

- a. Gymnasiums/Kitchens/Shops: Single control device space mounted.
- b. Toilet Rooms: Enclosed within radiation housing.
- c. Shower Rooms/Drying Rooms: Enclosed within radiation housing.
- d. Natatoriums: Located in return air inlet.
- e. Auditoriums/Cafeterias/Classrooms/Offices: Wall mounted.
- f. Mechanical Rooms: Wall mounted.

8. Warranties:

All equipment shall be provided with a two (two years) warranty from the period of owner's acceptance except where indicated in the SDS.

9. Restrictions:

- a. The District does not operate cooling and heating plants simultaneously, therefore reheat is unavailable during cooling season. Cooling plant operation is restricted therefore 100% economizers are critical to maintain comfort during season transitions when cooling plant is off-line. Variable air volume systems are not desirable.
- b. Use dual fuels in all facilities (No.2 oil and interruptible gas service). No design shall incorporate gas only.
- c. Flexible ductwork is to be avoided.

- d. Designers shall attempt to locate outside air intakes twenty-five feet from all exhausts, vents and stacks. Intakes below this amount are to be noted.
- e. Maximum heating hot water temperature is 180° F
- f. Use of Ice storage systems are not acceptable (needs prior approval, if determined to be more energy efficient).
- g. Grade level installation of equipment air-cooled chillers, cooling towers etc. have been subject to severe vandalism. Installations at grade are to be avoided.
- h. Under no circumstances is duct mounted humidification to be provided.
- i. Globe valves shall only be used where a throttling requirement exists. The District prefers the use of ball valves for line size up to 2.5" and butterfly valves for line size above 2.5" on all non-throttling shut off applications. All strainers 1" and larger shall be provided with blow down valve on strainer discharge.
- j. Flexible ductwork is not permitted.
- k. Door louvers are not permitted. Consultants shall use door undercuts or transfer grilles (ceiling mounted) where additional air volume is required.
- l. Direct-fired furnaces are not permitted on any device.
- m. The use of T-drill, T-drill II, Rigid pipe clamp system or other devices to fasten steel piping is prohibited. (Use of T-drill to form butt-weld Tee fittings for copper tuning and piping is permitted. Such mechanically formed tee fittings shall be brazed in accordance with the Copper Development Association's Cooper Tube Handbook using BcuP series filler metal.)
- n. All discharge piping from F&T traps must pitch towards the condensate feed tank on low-pressure steam applications.

10. Priorities

The average District school building is approximate fifty-eight years old. The longevity of building systems is a high priority. Equipment should be selected based on durability and minimal maintenance requirements. All routine maintenance items filters, strainers, belts, etc. should be designed for easy access requiring no or limited use of ladders. Designers are to prioritize designs based on:

- a. Equipment longevity
- b. Maintainability
- c. Energy efficiency
- d. First cost

11. Exceptions

Any deviations from the District standards are to be reviewed and approved prior to the incorporation in any design. Changes to the base design concept will require a lifecycle/operating cost analysis. Operating cost analysis shall be based on actually school usage allowing for summer outage and reduced usage. Operation of central plant shall compare to the District's operating cycle. Equipment life expectancies are to be based on District standards.

ALARM AND DETECTION EQUIPMENT (Division 16)**Design Criteria and Technical Standards**

- Design and specify security system according to the following features:
 - Input/Output Capacity
 - User authorization Level Capacity
 - Keypad Operating/Display
 - Loop configuration
 - Keypad Communication
 - Output Relays Type
 - Primary Power Rating
 - Secondary Power Supply Type
 - Battery Supervision Procedures
 - Ground Supervision Feature
 - Output Rating to Audible Signal Bell
 - Auxiliary Output Rating
 - Keypad Trouble Procedures

- Design and specify security system with remote communication capability that includes the following features:
 - Central Station Capability
 - Communicator Program Capabilities
 - Automatic Recall Time Feature
 - Communication Failure Output
 - Power Fail Delay Procedure

- Design and specify security system with System Capabilities that include the following features:
 - Arm Display
 - Opening Code
 - Closing Code
 - Any Bypass
 - Entry Delay
 - Exit Delay

- Design and specify security system with output control capability that includes the following features:
 - Cutoff for Future Bell
 - Action for Future Bell

- Design and specify security system with user capabilities that include the following features.
 - Arm/Disarm
 - Silencing Bell and Display
 - Display List of Armed Areas
 - Loop Status
 - Bypass Loop Procedures
 - System Testing Procedures
 - Addition/Deletion of User Codes
 - Setting of Date/Time in System

- Design and specify security system with display capabilities that include the following features:
 - Selective Monitoring of Loops
 - System Trouble Monitoring
 - Annunciation/Display of Burglar Alarms
 - Annunciation/Display of Supervisory Alarms
 - Annunciation/Display of Auxiliary Alarms

- Design and specify security system with area identification capabilities.

- Design and specify security system with Loop zone capabilities that include the following:
 - Loop Name
 - Loop Type
 - Loop Message
 - Pre-warn Address

- Design and specify security system with system operations that include the following:
 - User Codes
 - Output Schedules
 - Burglar System Schedules

- Design and specify security system with components that include the following:
 - Command Processor Control Panel
 - Security Command Keypads
 - Lightning Suppressor
 - Communication Modules
 - Polarized Bell Module
 - Primary Power Supply
 - Secondary Power Supply
 - Detection devices

- Design and specify security system with zoning as requested by SDOP.

Schedule and specify magnetic intrusion alarms on doors and windows as requested by SDOP.

Specify insulated assemblies at exterior locations and fire rated assemblies at fire rated doors.

Schedule and specify passive infrared detectors in spaces as requested by SDOP.

Preferred Products

(None)

BROADCAST RECEPTION EQUIPMENT (Division 16)**Design Criteria**

- A closed circuit T.V. system is to be designed and specified as an entire system providing effective television reception of 3000 MV minimum signal strength at all monitors, and consists of the following:
- System includes antenna, front end modulators, amplifier, equipment cabinets, conduit, transmission cable, junction boxes, splitters, outlets and other necessary devices.
- Amplifier and modulator is to be located near or at location where antenna cable enters the building. All conduit of the system originates at that point.
- Television monitors will be procured by SDOP.
- Power outlets, mounting brackets, and locations of monitors are to be coordinated with SDOP in order to meet the Educational Criteria.

Preferred Products

Closed circuit T.V. system: Jerrod Electronics
Blonder-Tongue

EMERGENCY LIGHTING (Division 16)**Design Criteria**

- Power for emergency lighting system is to be provided by a natural gas (if available) driven, water-cooled generator set for loads up to 50KW, and diesel fuel for loads over 50KW. Specify inclusion of a cranking battery, charger, automatic transfer switch, normal/emergency panel board, and associated wiring.
- Lead-Acid Battery power source for emergency lighting may be specified for existing buildings if not economically feasible to install a generating unit.

Preferred Products

(None)

EXTERIOR LUMINAIRES (Division 16)**Design Criteria**

- Design security lighting to be located between second and third floors, using high pressure sodium lamps, with fixtures on timers.
- Give thorough consideration to accessibility arrangement of fixtures for lamp and ballast replacement.
- Specify wire guards or other protective devices for fixture lamps and lenses.
- Design canopy lights using fluorescent or compact fluorescent lamps, with fixtures on timers.

Preferred Products

(None)

FIRE ALARM SYSTEM (Division 16)**Design Criteria**

- Provide non-coded, analog addressable fire alarm system.
- Design the fire alarm system according to the exceptions provided in the Philadelphia Fire Code and do not provide any manual fire alarm boxes in student areas like corridors, gymnasium, auditorium, cafeteria, etc., Provide manual fire alarm boxes at the following locations only: one in the main office, one in the building engineer office, one or two in boiler room and one in kitchen.
- Provide fire alarm control panel with a digital alarm communicator transmitter (DACT) for off-premises monitoring of the control panel. Provide two Cat. 5 cables from the fire alarm control panel to the telephone demarcation station (main telephone service box).
- The Fire Alarm Control Panel shall be capable of operating remote CRT's and/or printers. The output shall be serial ASCII from an EIA RS-232-C connection with an adjustable baud rate of 300, 1200, 2400, 4800 or 9600 to allow use of compatible UL864 listed CRT/Keyboard or printer.
- Provide remote annunciators at main entrance, in main office and in building engineer's office.
- Provide non-coded single action type addressable manual pull stations.
- If the exceptions to the manual fire alarm boxes can not be applied and fire alarm boxes must be provided, then provide plastic covers with battery powered audible sounder over all manual pull stations located in corridors, lobbies, locker rooms and cafeteria. Provide wire guards to all pull stations located in gymnasium.
- Provide wire guards to all strobes and horn/strobes units located in gymnasium and locker rooms.
- Provide duct detectors where required by NFPA code. Provide remote test switch with LED alarm indicator for each duct detectors.
- Connect all fire extinguishing control equipment, sprinkler system valve temper switches and sprinkler water flow switches to the fire alarm system.

- Connect all elevator control equipment to the fire alarm system for elevator recall function.
- Provide a sign to each manual pull station. The sign shall be mounted immediately adjacent to the manual pull station. The sign shall read “IN CASE OF FIRE: SOUND ALARM AND CALL THE FIRE DEPARTMENT”.
- Mounting heights of fire alarm devices shall comply with ADA requirements. The fire alarm pull stations shall be mounted maximum at 48” and minimum at 42” above finished floor. The strobe units and horn/strobe combination units shall be mounted at 80” above finished floor or 6” below the ceiling whichever is lower.
- The strobe locations shall be as required per NFPA 72, section 6-4.4.2. The strobes in corridors shall be located no more than 15 feet from the end of corridors. The spacing between strobes in corridors shall be less than 100 feet.
- Provide remote NAC power extender panels as required for horn/strobe circuits. Do not locate these panels in janitor closets, bathrooms or any wet or damp areas.
- Provide normal/emergency power circuits to the fire alarm control panel and all remote NAC panels (not applicable to buildings which do not have emergency generators).
- Provide a complete new raceway system for the new fire alarm system and installed all fire alarm wiring in metal conduit. Provide galvanized rigid steel conduit for all riser conduits and all conduits in mechanical, electrical and boiler rooms. Paint all junction boxes with red color paint and label as “FIRE ALARM”.
- Whenever existing fire alarm system is to be replaced with a new system, do not remove existing fire alarm system until new system has been installed, tested, approved and under operation.

Preferred Products

Fire alarm System Equipment:

Edwards Systems Technology, Inc.
 NOTIFIER; a GE-Honeywell Company.
 Siemens Building Technologies, Inc.; a Cerberus Division
 Simplex Grinnell LP; a Tyco International Company

INFORMATION TECHNOLOGY EQUIPMENT (Division 16)

Design Criteria:

Refer to School District of Philadelphia/ Philadelphia School Improvement Team IT Standards dated October 1, 2005 which are located on the SDOP website.

INFORMATION TECHNOLOGY EQUIPMENT (Division 16)

Design Criteria:

Refer to School District of Philadelphia/Philadelphia School Improvement Team IT Standards dated October 1, 2005 which are located on the SDOP website.

INTERIOR LUMINAIRES (Division 16)**Design Criteria**

- Do not specify incandescent or mercury vapor lamps.
- Specify that 2-tube fixtures may be wired in tandem on a single ballast, and that one 4-tube fixture will use a single ballast.
- Corridor lights are to be controlled by switches accessible only to qualified personnel.
- Night lights in corridors are to be provided on dedicated circuits and located at intersections and at intervals of 75 feet, maximum.
- Design lighting in entrance hallways, that is separately circuited, switched near inside of entrance door, and is adequate to provide minimal illumination for staff personnel to see their way from the entrance to the main lighting panel box.
- In Classrooms, Hallways, and Offices that are new construction or in projects where a significantly large scope of lamps are being retrofitted, design using T-8 type fluorescent lamps and low-harmonic electronic ballasts.
- In elementary school auditoriums, with low ceilings, design lighting with T-8 type fluorescent lamps that have low-harmonic electronic ballasts. For high ceilings, use metal halide fixtures.
- In middle and high school auditoriums, design lighting with metal halide fixtures with quartz re-strikes for instant or continuous lighting.
- Auditorium back-stage lighting panel is to have a lighting fixture to illuminate it.
- Catwalks above stages in auditoriums are to be illuminated.
- In small gymnasiums, with low ceilings, and existing fluorescent fixtures, design retrofit with T-8 type fluorescent lamps and low-harmonic electronic ballasts. Fixtures are to be provided with heavy duty guards with sufficient space between the guard and lamps to prevent breakage. Guards are to be supported from ceilings.

- In large gymnasiums, design lighting with metal halide fixtures with heavy duty guards. Replace mercury vapor fixtures wherever possible.
- In cafeterias, design lighting with T-8 type fluorescent lamps and low-harmonic electronic ballasts.
- At teachers' lounges and conference rooms, provide motion sensor light switches.
- In mechanical and electrical equipment rooms design lighting using industrial type fixtures with T-8 type fluorescent lamps.

Technical Standards

- Do not specify incandescent or mercury vapor lamps.
- Specify that 2-tube fixtures may be wired in tandem on a single ballast, and that one 4-tube fixture will use a single ballast.
- Indicate that auditorium wall fixtures are to be hard-wired with built-in ballasts and compact fluorescent lamps of 13 - 18 watts.
- Specify exit signs to be diffused LED type, as approved by SDOP. If no suitable LED type is available, specify hard-wired fixtures with built-in ballasts, and PL-5 fluorescent lamps.
- Provide accessible, secure lighting panel boxes within the activity areas of gymnasiums and cafeterias.
- Provide manuals for occupancy sensors and other automatic control hardware.
- Provide a maintenance manual to include the following:
 - ❖ As-built plans showing the installed lighting systems.
 - ❖ Luminaire schedule that includes detailed lamp and ballast information.
 - ❖ Luminaire cut sheets.
 - ❖ Lamp inventory list, including recommended stocking quantities.
 - ❖ Manufacturer data for all lighting controls, including operating documentation and tuning procedures.
 - ❖ Procedures for maintaining lighting controls.
 - ❖ Luminaire cleaning and troubleshooting procedures.
 - ❖ Group relamping procedure and scheduling criteria.
 - ❖ Lamp recycling plan and contacts.

Preferred Products

(None)

LIGHTING DESIGN (Division 16)

Design Criteria

- Lighting is to be provided at the illumination levels indicated below with direct and reflected photometric brightness controlled and balanced to prevent glare, which is assumed to extend 45deg above the horizon.
- Provide occupancy sensors in classrooms, gymnasium, cafeteria, IMC, auditorium, toilet rooms, teacher's lounges, offices, conference rooms for automatic lighting control to comply International Energy Code.
- Individual space plates designate spaces that require multi-level switching.
- Areas provided with day lighting shall have Foot Candle sensors and open-loop controls to automatically dim or shut off lights when not required to achieve the designated space illumination level.
- Brightness ratio of a lighting source or the illuminated portion of a luminaire, to its surround is to be less than 3 and as close to unity as is economically practical.
- Ceiling reflectance is to be high to enhance the brightness ratio and to increase effective utilization of light.
- Illumination and day lighting are to be coordinated and controlled to avoid veiling reflections on chalkboards, T.V. monitors, and projection screens.
- Accessibility for cleaning is to be considered in the selection of Luminaires.
- Close liaison between the Lighting Designer and the Architect is to be established early in the Project with regard to lighting schemes, interior finishes, colors, and fenestration.
- Lighting design is to be accomplished using the Average Flux Method of computation.
- Lighting fixture layouts are to be symmetrical, where possible. Unconventional layouts are not to be used.

- Stairway lights are to be controlled from emergency panels located on the Ground Floor, except in large buildings, where they are to be controlled by switches that are accessible only to qualified personnel.
- Exit lights are to be connected to the emergency lighting panel on dedicated circuits and are not to be locally switched.

Technical Standards

- Design and specify the following illumination levels:
Confer with SDOP about areas not listed.

ILLUMINATION TABLE – 8600-10

	foot-candles maintained
Administration Suite	70
Art Rooms.....	70
Auditorium.....	35
Boiler Room.....	25
Cafeteria and Faculty Dining.....	35
Classrooms.....	50
Conference Rooms.....	35
Corridors.....	20
Dishwashing Rooms.....	70
Drafting Rooms.....	70
Drying (shower) Rooms.....	15
Entrance Lobby	35
Gymnasiums.....	40
Health Suites.....	70
Instructional Materials Center	
Reading Areas.....	70
Stacks.....	30
Home Economics.....	40
Sewing.....	100
Kindergarten and Pre-School Nursery.....	45
Kitchen.....	35
Laboratories.....	50
Laundry.....	25
Lecture Rooms	
Audience Area.....	45
Demonstration Area.....	100
Locker Rooms.....	20
Mechanical Equipment Rooms.....	25

Music Rooms.....	70
Multipurpose Room.....	40
Offices (non-administrative).....	70
Shops.....	50
Showers (runway and group).....	15
Storage Rooms and Closets.....	15
Stairways.....	20
Teachers' Lounges.....	35
Teachers' Workrooms.....	70
Toilets.....	30

Preferred Products

(None)

LOW-VOLTAGE DISTRIBUTION (Division 16)

Design Criteria

- **Branch circuit capacities** are to be adequate to provide the following minimum wattages:

<u>Space</u>	<u>Watts/ Sq. Ft.</u>
Offices	5
Classrooms	5
Storage Areas (large)	5
Lobbies	4
Corridors (permanent)	2
Toilets	2
Storage (small)	2
Utility Rooms	2

Receptacle or Outlet

Wall Receptacles	150
Fan Outlets	75
Electric Water Coolers	600
Cleaning Equipment Outlets	300

- Maximum load for branch circuits is 1500 watts or eight (8) duplex outlets.

Technical standards

- Specify that conduit is to be provided for telephone and other communications lines concealed within walls and partitions, from outlet box to a point 6" above the ceiling.

Preferred Products

(None)

LOW VOLTAGE SWITCHGEAR (Division 16)**Design Criteria**

- Secondary service switchgear includes:
- Main service breaker to be adjustable trip type air circuit breaker.
- Panels for main power distribution and lighting are to be dead front, bolt-on circuit breaker type. Use of molded case type is acceptable up to and including 800 amperes, if the interrupting capacity ratings are adequate for their particular location in the system.

Technical Standards

- Specify that primary switchgear is to be free-standing, 600 amp fused, interrupter switch type with main secondary circuit breaker.
- Specify that all switchgear is to be assembled, provided, and guaranteed by a single source that will also submit current coordination curves.

Preferred Products

(None)

MOTOR STARTERS (Division 16)

Preferred Products

Motor Starters: Cutler-Hammer, 9101 Series
Westinghouse
General Electric

MOTORS AND GENERATORS (Division 16)

Technical Standards

- Specify connection of the following loads to the emergency generator:
 - Emergency lights
 - Public Address system
 - Master Clock system
 - Fire Alarm System
 - Fire Pumps
 - Elevators with manual transfer of only one elevator at a time
 - Boiler controls
 - One boiler
 - Sump pumps

Preferred Products

(None)

NORMAL/EMERGENCY LIGHTING PANELBOARDS (Division 16)**Design Criteria**

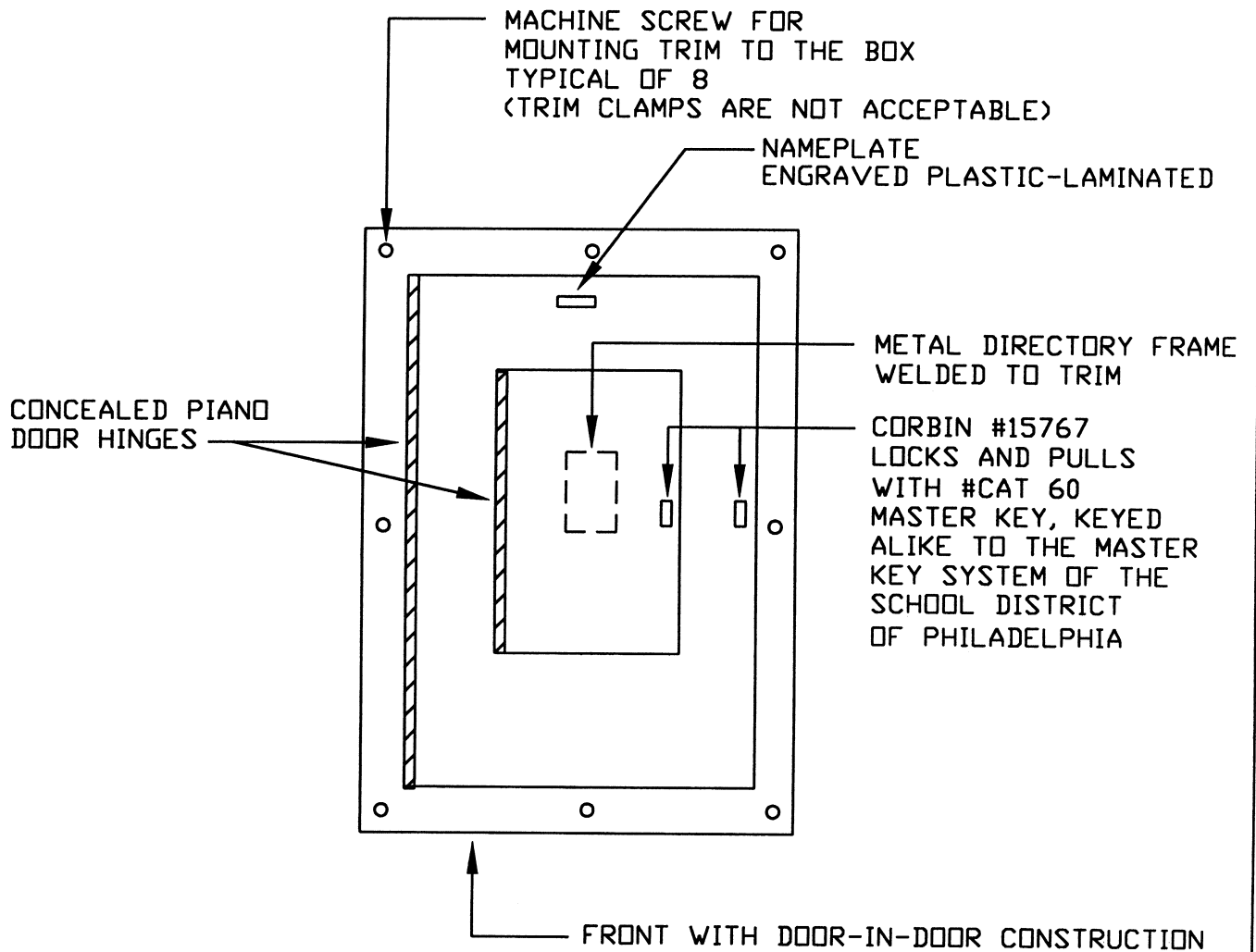
- For energy savings during non-occupied duration of the school building, the School District has a policy to transfer all emergency lights except exit lights from normal-emergency power to the emergency only power. To comply with this energy saving criteria, all normal-emergency lighting panels shall be provided as indicated in this section.
- Provide dead-front safety type normal-emergency lighting panelboards with arrangement shown, with anti-turn solderless pressure-type main lug connectors approved for copper conductors.
- Provide normal-emergency lighting panelboards with split phase copper bus bars, one normally-off emergency only power bus bar for each ungrounded phase conductor and one normally-on normal-emergency power bus bar for each ungrounded phase conductor.
- Provide a bare uninsulated copper grounding bar suitable for bolting to enclosure.
- Provide normal-emergency lighting panelboards with molded-case bolt-on-type branch circuit breakers for each circuit, with toggle handles that indicate when tripped. Provide circuit breakers with minimum 10,000 RMS symmetrical interrupting current rating.
- Provide normal-emergency lighting panelboards with 3-way switches for all normal-emergency lighting branch circuits, which are to be transferred from normal-emergency power to the emergency only power during non-occupied duration of the building.
- The 3-way AC switches shall be general-duty, flush type, 30 amperes with mounting yoke insulated from mechanism. Equip with plaster ears, lock-type switch handles, and side-wired screw terminals with break-off tab features, which allows wiring with separate or common feed.
- 3-way switches shall be flush-mounted on fronts of the cabinets to operate externally without opening the fronts or doors. Mount switches horizontally and identify both positions of the switches, emergency position side by red nameplate stating "EMERGENCY" and normal/emergency position side by black nameplate stating "NORMAL/EMERGENCY". Identify each circuit (3-way switch) by a white nameplate. Provide engraving stock melamine plastic laminate nameplates.

- Each 3-way switch shall be factory wired to one branch circuit breaker connected to the normal/emergency bus and one branch circuit breaker connected to the emergency only bus of the same phase. All wires shall be copper, S.I.S. type, minimum #10 AWG.
- Panel board Enclosures: Provide galvanized sheet steel cabinet-type enclosures, code-gage, minimum 16-gage thick, 24 inches wide and 6 inches deep. Construct with multiple knockouts and wiring gutters.
- Provide fronts with full hinges and doors (door-in-door construction). Provide fronts with hinges on right unless specified and fasten to the cabinet with machine screws. Provide doors with flush locks and keys, with concealed piano door hinges as indicated. Equip door with interior circuit-directory frame, and card with clear plastic covering.
- Provide baked gray enamel finish over a rust inhibitor inside and outside of the cabinets and fronts.
- Design enclosure for surface mounting.
- Provide enclosures fabricated by same manufacturer as panel boards, and which mate properly with panel boards to be enclosed.
- Locks and Keys: All locks and keys for panels shall be keyed alike and keyed to the master key system of the School District of Philadelphia. Locks and pulls for doors of cabinets shall be Corbin #15767. The master key shall be #CAT 60.
- Each normal-emergency lighting panel boards shall be supplied with two power feeders, one normal-emergency power feeder from the automatic transfer switch and one emergency only power feeder from the emergency generator.
- Refer to the Philadelphia School District's typical details for the normal-emergency panel wiring diagram and enclosure design.

Preferred Products

Normal/Emergency Lighting Panel boards:

Penn Panel & Box Company
 Willows Ave.
 P. O. Box 1458
 Collingdale, PA 19023-8458
 Tel: (610) 586-2700
www.pennpanel.com



PANELBOARD FRONT STANDARD DETAIL
NO SCALE

THE SCHOOL DISTRICT OF PHILADELPHIA
PANELBOARD FRONT STANDARD DETAIL

DRAWN BY: RAMESH PATEL, P.E.
DATE: 6-19-2000

SK-1

RACEWAYS AND BOXES (Division 16)**Design Criteria**

- Conduit is to be rigid, galvanized steel and EMC based on code allowances.
- PVC conduit may be used below interior slabs on grade and for buried exterior installations with a minimum of 30 inch cover.
- MC may be used, where permitted by code for branch circuits and feed to light fixture.
- Cable trays shall be used for technology raceways above corridor ceilings (S hooks are not acceptable).
- Underfloor duct system is to be combination power and signaling type, complete with insert markers. Location of underfloor duct system is to be coordinated with furniture layout.

Technical Standards

- Specify all Conduits 5 feet below finished floor in Mechanical Rooms to be waterproof.

Preferred Products

Conduit: General Electric
 Carlson
 Walker
 National

Underfloor duct system: Walker
 National
 Square D

SCOPE OF ELECTRICAL DESIGN (Division 16)**Design Criteria**

- Temporary power when replacing switchgear. (Temporary electric service to be indicated on Site Plan and submitted to PECO for cost estimate before Project is advertised.)
- Main electric service.
- Panels for power and lighting
- Cable and conduit for power, lighting, controls, and miscellaneous systems.
- Grounding system.
- Starters and controllers, except where starters and controllers are part of package units.
- Raceways for communications lines. Communication cables, wires, instruments, and accessories are provided and installed by vendors.
- Sound and Public Address system except where contracted directly with vendor.
- T.V. system, including amplifier, cabling, and outlets.
- Feeders and disconnect switches for motorized equipment, including elevators.
- Door bell system.
- Smoke detection system.
- Receptacles and switches.
- Lighting fixtures.
- Emergency lighting system.
- Fire alarm system.
- Underfloor duct system.

- Painting of special raceways, boxes, cabinets, high voltage conduit, fire alarm boxes, fire alarm switches and power supply switches.
- PECO is to be consulted, and reports submitted about:

Class of service
Proximity of power lines
Anticipated costs (if any) of extending utility lines
Availability of electric power in quantities anticipated
Reliability of service at project location

- Primary voltage, where a choice is possible, should identify the highest voltage offered, if a cost benefit analysis indicates that billing savings will amortize the additional costs within ten (10) years.
- Large motors (over 200 HP) are to utilize 4,160 or 2,300 volts, if available.
- Design analysis report for classroom lighting is to be submitted during the Design Development Phase of the Project.
- Design and construction of electrical systems are subject to regulations of the following public agencies:

Commonwealth of Pennsylvania Department of Labor and Industry,
regulations for protection from fire and panic

City of Philadelphia building code relating to emergency lighting

National Electric Code

School District of Philadelphia

SOUND REINFORCEMENT (Division 16)**Design Criteria**

- A sound reinforcement system shall be provided for in all classrooms and laboratories. The system shall include a port in the classroom to plug the receiver/amplifier system into for broadcast within the room through the speakers of the building public address system that are located in the rooms.

Preferred Products

(None)

TELEPHONE AND INTERCOM SYSTEM (Division 16)**Design Criteria**

- An Intercom system is to be provided for the Principal's office, Principal's secretary, administrative assistant, and counselors.
- A public address system, with intercom feature, is to be designed and specified as an entire system, providing voice communication throughout the building and outdoor play areas.
- Three-channel transistorized PA system for Secondary Schools, two-channel for Primary Schools.
- Main console is to include separate jacks for input from a radio tuner and a tape recorder. Console is to be located near a secretary or staff person's desk.
- Microphones and cabling to console is to be provided at the console and from Principal's office and Secretary's desk.
- Exposed speakers located in locker rooms, gymnasiums, recreation rooms, multi-purpose rooms and outdoor areas are to be protected with #11 gauge, 2" square mesh wire guards in metal frames. All components of wire guards are to be galvanized.
- Selector switches are to be provided in each room or area.
- Telephone type handsets are to be provided in all instructional areas. Their operation is to be arranged to take precedence over the PA speaker in that area.
- Auxiliary sound systems with separate amplifiers and microphones are to be provided in auditoriums, gymnasiums, multi-purpose rooms, recreation rooms, and cafeterias. Auxiliary systems are to include jacks for input from other separate equipment such as radio or tape player. Other separate equipment will be provided by SDOP. Auxiliary systems are to be connected to the PA system for program exchanges, with priority override by the PA system.
- A Telephone system, specified and procured by SDOP Telecommunications Department, will utilize the following components that are to be designed and specified as part of the Electrical Contract:
(List of components)

Telephone service will be provided to the following locations:

Main office work stations and offices.
Office of Commerce department Head, (Secondary Schools)
Office of Physical Education Instructor, (Secondary Schools)
Medical Suite
Counselors' offices
Dietician's office
Custodian's office
District personnel's offices, (if any)

Preferred Products

(None)

TRANSMISSION AND DISTRIBUTION (Division 16)**Design Criteria**

- Distribution voltage is to be three (3) phase, four (4) wire, 480/277. Buildings covering large first floor areas are to be considered for the use of several sub-stations. The 480/277 voltage is to be used for motor loads and lighting loads. The 120/208 voltage is to be used for receptacles and fractional horse power motors.

Preferred Products

(None)

WIRE AND CABLE (Division 16)**Design Criteria**

- Lighting feeders, including sub-feeders to branch panels, are to be sized for the total full connected load of all branch circuits served, including spares, plus 25%, with a voltage drop not to exceed 1% based on connected load.
- Branch wire for all power and lighting is to be 600 volt, type THW, or type THWN single copper conductor.
- Main service cables are to be of type as approved by PECO.

Preferred Products

Wire and Cable: General
 National
 Anaconda

WIRING DEVICES (Division 16)**Design Criteria**

- Safety switches are to be quick-make and quick-break type "ND" without masked or shielded contacts. They are to be designed to operate if the operating spring fails, or is removed, and to have interlocks so that operation is impossible when the cover is open. Safety switches are to be arranged for padlocking in the open or closed position, and to have NEC approved cartridge fuses on motor circuits.
- Toggle switches are that operate on 120 volts are to control no more than 1500 watts.
- Flush switches located on columns, pilasters, or permanent partitions or walls, are to operate ceiling outlets. Pull chains are not to be used. Switches are not to be located at center-lines of columns.
- 20 amp duplex wall receptacles, NEMA grounding type, are to be provided in all rooms and corridors, with at least one (1) receptacle on each permanent wall. They are to be wired on separate circuits except where there are fewer than three (3) or their location makes separate circuits impractical.
- Heights and locations of receptacles under window sills, near radiators or casework, or other special conditions, are to have special coordination attention.

Preferred Products

Safety Switches: Square D
 Trumbull
 General Electric
 Westinghouse

Fluorescent lighting switches: Hubbell 1200 series

Other interior switches:

Exterior switches:

Power receptacles: Hubbell
 P & G
 Bryant

INSTALLED EQUIPMENT (Division 11)

Design Criteria

Installed equipment includes the following, as applicable to each project. Confirm scope of equipment with SDOP.

- Security and vault equipment
- Library equipment
- Theatre and stage equipment
- Loading dock equipment
- Food service equipment
- Darkroom equipment
- Athletic equipment
- Laboratory equipment

Preferred Products

Consult with SDOP about individual types of equipment.

GYM LOCKERS (Division 10)**Design Criteria**

- Do not design poured concrete bases for lockers.

Technical Standards

- Specify locker dimensions as 12"w X 18"d X 6'h.
- Specify single and five tier lockers
- Specify that configuration to be alternating single and five tier lockers.
- Specify that single tier lockers to have a hat shelf.
- Specify that lockers are to be ventilated.
- Schedule and specify sloped tops for lockers at locations requested by SDOP.
- Specify overall steel product shall contain a minimum of 20% recycled content: identified by weight as post consumer and/or pre-consumer.
- Specify locker manufacturer located locally (within 150 miles).
- Specify: Regulatory Requirements: where metal lockers are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for buildings and Facilities (ADAAG)".
 - 1) Provide not less than one half located no higher than 48 inches above the floor for forward reach.
 - 2) Provide one shelf located at bottom of locker no lower than 15 inches above the floor for forward reach.
 - 3) Provide hardware that does not require tight grasping, pinching, or twisting of the wrist, and that operates with a force of not more than 5 lbf.

- Specify LEED Submittals:
 - 1) Product Data for Credit MR 4.1 and Credit MR 4.2: Documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.
 - 2) Product Data for Credit MR 5.1 and credit 5.2: Documentation indicating location of product manufacturing, extraction and processing of materials, including costs for products.

Preferred Products

Penco Products
DeBourgh Mfg. Co.
Lyon Workspace Products, LLC
Republic Storage Systems Company

HALL LOCKERS (Division 10)**Design Criteria**

- Do not design poured concrete bases for lockers.

Technical Standards

- Specify locker dimensions as 12"w X 18"d X 6'h.
- Schedule and specify sloped tops for lockers at locations requested by SDOP.
- Specify overall steel product shall contain a minimum of 20% recycled content: identified by weight as post consumer and/or pre-consumer.
- Specify locker manufacturer located locally (within 150 miles).
- Specify: Regulatory Requirements: where metal lockers are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for buildings and Facilities (ADAAG)".
 - 1) Provide not less than one half located no higher than 48 inches above the floor for forward reach.
 - 2) Provide one shelf located at bottom of locker no lower than 15 inches above the floor for forward reach.
 - 3) Provide hardware that does not require tight grasping, pinching, or twisting of the wrist, and that operates with a force of not more than 5 lbf.
- Specify LEED Submittals:
 - 1) Product Data for Credit MR 4.1 and Credit MR 4.2: Documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.

2) Product Data for Credit MR 5.1 and credit 5.2: Documentation indicating location of product manufacturing, extraction and processing of materials, including costs for products.

Preferred Products

Penco Products
DeBourgh Mfg. Co.
Lyon Workspace Products, LLC
Republic Storage Systems Company

STUDENT WARDROBES (Division 10)**Design Criteria**

- Do not design poured concrete bases for wardrobes.
- To be provided in grades K-5 only.
- Design for 33 students.

Technical Standards

- Specify **wardrobe dimensions** to be as follows:
 - Single Student Wardrobe – 12”w x 60”h x 17”d
Wardrobes shall be open front, fixed upper shelf, with one ceiling mounted double coat hook
 - Double Student Wardrobe – 16”w x 60”h x 17”d
Wardrobes shall be open front, fixed upper shelf, with one ceiling mounted double coat hook with two sides mounted single hooks.
- Specify LEED Submittal:
 - Product Data for credit EQc4.1: submit material safety data sheets (MSDS) listing chemical components for each adhesive, sealant, and sealant primer product used on the interior of the project for casework installation.
 - Product Data for credit EQ4.4: for composite wood products, provide documentation indicating that product contains no added urea-formaldehyde resins.
- Specify that all adhesives and sealants applied on-site shall comply with the South Coast Air Quality Management District (SCAQMD Rule #1168) effective date of July 1, 2005 and rule amendment date of January 7, 2005.

Preferred Products

LSI Corporation

FSC Certification.

FOOD SERVICE EQUIPMENT (Division 11)**Design Criteria**

- Design of kitchen layout will be reviewed by SDOP Food Services Department. Design kitchen in consultation with a specialized kitchen consultant experienced in projects for the type and size of school being designed, and who is knowledgeable of all current applicable codes.
- Carefully coordinate HVAC, plumbing, and electrical requirements of kitchen equipment with mechanical and electrical engineers.
- Specify energy efficient/energy star appliances.
- Specify products manufactured within 300 miles of project.
- Specify that hood fire suppression system manufacturer has ability to train and certify SDOP staff for maintenance of system.

Technical Standards

- Specify hot water to be 140 degrees F. to all kitchen and hand washing sinks, boosted to 180 degrees F. at three-compartment sinks.
- Do not design a separate 180 degree F. line that originates in the project's main mechanical equipment room.
- Do not provide a steam line to locations.
- Provide the following equipment as a basis of design:

Warming Kitchen:

- Roll in double oven, Southbend, model SLGS/22SC
- Milk Cooler, large 16 crate capacity, Beverage Aire
- Walk-in Refrigerator, Bally, custom sized per school
- Shelving for walk in Refrigerator, Stor-Tech, model STS, 4 tier w/ STCA5SBR casters
- Stainless steel Prep Tables - Advance, model SS-307
- Warmer, Metro, model C5Z69-SDS-U
- Three compartment sink - Advance, model 94-83-60-24RL
- Hand washing sink - Advance, model 7-PS-40

Full Service Kitchen:

- Walk in Refrigerator – Bally, custom sized per school
- Walk in Freezer – Bally, custom sized per school
- Dunnage Racks – Metro, model HP2248PD
- Shelving for Walk ins and Store Room – Stor-Tech, model STS, 4 tier w/ STCA5SBR casters
- Prep Sink – Advance, model VKS-3012/TA-11D2
- Food Slicer w/stand – Globe, model GC-12 w/ Advance, model KSS-304 stand
- Mobile mixer w/stand – Globe, model SP-20 w/ Advance MT-SS-302 stand
- Ice Machine w/ bin – Ice-O-Matic, model ICE0400/B55PS bin
- Hand Sink – Advance, model 7-PS-40
- Three Compartment Sink – Advance, model 94-83-60-24RL
- Waste Disposal – Salvajor, model 300-CA-18-ARSS
- Single Door Refrigerator, Victory, model VSR-1
- Two Door Refrigerator – Victory, model VSR-2
- Milk Coolers – Beverage-Air, model SM34NS
- Warmer Pass Thru – Metro, model C5Z69-SDS-U
- Range – Imperial, model IR-4-S18
- Double Deck Oven – Southbend, model SLGS/22SC
- Steamer – Market Forge, model ETP-10G
- Microwave Oven – Amana, model LD10D2
- Serving Counter – Delfield, custom sized per school
- Steam Table (four or five well) – Delfield, custom sized per school
- Cold Table (flat top) – Delfield, custom sized per school
- Cashiers Table – Delfield, custom sized per school
- Roll down Shutter
- Data drop at Cashier table
- Exhaust Hood (NO Auto Cleaning) – Captive-Aire, custom sized per school
- Condiment Counter – Delfield custom sized per school,
- Stainless Steel Prep Tables – Advance, model SS-307

Preferred Products:

Blodgett
Garland
Powers
Bev-Aire
Norlake
Bally
Penn
Metro
Alto-sham
Berkel
Hobart
Globe
Manitowac
Victory
Display
Ice-O-Matic
Stor-Tech
Imperial
Southbend
Market Forge
Amana
Delfield

FOOD STORAGE EQUIPMENT (Division 11)**Design Criteria**

- Design floor construction of walk-in refrigerator cases as 4" concrete slab over 4" minimum rigid insulation, finished to match floor height of kitchen.
- Design compressors for refrigeration cases to be remotely located. Do not locate compressors in kitchen space.
- Specify energy efficient/energy star appliances.
- Specify products manufactured within 300 miles of project.

Technical Standards

- Specify walk-in refrigerator cases in the Contract.

Preferred Products

(None)

LOADING DOCK DESIGN (Division 11)**Design Criteria**

- Design loading dock height to be 36".
- Consider curb-side loading if excavation is required to achieve standard dock height.
- Consider using an oil trap to keep oil from leaching into ground.

Technical standards

- Do not specify or detail dock levelers.
- Specify dock bumpers as laminated rubber strips bolted to face of dock.
- Consider using recycled rubber.

Preferred Products

(None)

AUDITORIUM SEATING (Division 11)**Design Criteria**

- Design auditorium seating to include the following:
 - Tablet arms at every second seat in front rows, max. 100
 - Low back style

Technical Standards

- Specify face to be Maple veneer.
- Specify that seat backs and tablet arms are to be painted dark colors.
- Specify that back wings to be formed from 14 ga. Steel.
- Specify hinge assembly for tablet arm formed from 12 ga. Steel with 5/8" pivot rod.
- Specify stop mechanism to be solid steel with neoprene cushions.
- Specify armrest to be solid hardwood.
- Specify LEED Submittals:
 - Product Data for LEED credit EQ4.2: manufacturer's product data for paints, including printed statement of VOC content and chemical components.
 - Product Data for LEED credit EQ4.4: adhesive and composite wood materials manufacturer's product data indicating urea-formaldehyde content.
 - Product Data for LEED credit MR7: certificates of chain-of-custody signed by manufacturer's certifying that wood products were obtained from forests certified by an FSC- accredited certification body to comply with FSC 1.2, "Principals and Criteria".
 - Include evidence that manufacturer is certified for chain-of-custody by an FSC-accredited certification body.

- Specify that seats comply with applicable requirements of the Americans with disabilities Act “Accessibility Guidelines” (ADAAG), together with ANSI A117.1 “Specifications for Making Buildings and Facilities Accessible to and Useable by Physically Handicapped People.”

Preferred Products

Irwin Seating Company, Crusader model

STAGE CURTAINS (Division 11)**Design Criteria**

- Design stage curtains to include but not limited to the following:
 - Bi-parting proscenium curtain
 - Opaque lining
 - Side tormentors
 - Top teaser
 - Back cyclorama
 - Other wing curtains and teasers as requested by SDOP.
- Consult with SDOP regarding stage curtain color(s).
- Consult with SDOP regarding manual or power operation of stage curtain.

Technical Standards

- Specify replacement of existing track, carries, and other operating hardware identified by SDOP as not functioning satisfactorily. Specify replacement with new items of quality equal or superior to existing.
- Specify factory applied Scotch Guard treatment of curtain fabric.

Preferred Products

Boucle Fabric:	Frankel Associates, Inc. Valley Forge Fabrics	"Bolero Boucle # 202" "Reno-Superweight"
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**CHALKBOARDS, MARKERBOARDS & VISUAL AID BOARDS
(Division 10)**

- CHALKBOARDS
 - Face Sheet: Minimum .021 inch thick porcelain enamel steel with matte finish.
 - Core: 3/8 inch thick particleboard.
 - Backing: .005 inch thick aluminum foil.
 - Trim: Factory applied anodized extruded aluminum.
 - Chalk tray: Box type.
 - Map Rail: 1 inch display rail with cork insert and a map hook and clips for every 48 inches of map rail and fraction thereof.
 - Mounting height to be 36" above finished floor, or as directed by SDOP.

- MARKERBOARDS
 - Face Sheet: .021 inch thick liquid chalk writing surface, with low gloss finish.
 - Core: 3/8 inch thick particleboard.
 - Backing: .005 inch thick aluminum foil.
 - Trim: Anodized extruded aluminum with tray and 1 inch map rail with natural cork insert.
 - Trim: Factory applied anodized extruded aluminum.
 1. Chalk tray: Box type.
 2. Map Rail: 1 inch display rail with cork insert and a map hook and clips for every 48 inches of map rail and fraction thereof.
 - Mounting height to be 36" above finished floor, or as directed by SDOP.

- TACKBOARDS
 - Material, provide one of the following:
 - Natural cork,
 - Plastic impregnated,
 - Vinyl fabric faced industrial fiberboard.
 - Trim: Factory applied anodized extruded aluminum.

- PEGBOARDS
 - Material: Tempered hardboard with holes punched on one inch centers.

- ACCESSORIES
 - Provide the following accessories for each individual chalkboard and marker board unit:
 - 2 map rail ends
 - 1 flag holder (one per room)

- Specify mildew resistant, non-staining adhesives.

- Specify LEED Submittals:
 - Provide documentation for credit MR 6.0: product data indicating percentages by weight of rapidly renewable material content for products having rapidly renewable material content.
 - Provide documentation for credit EQ 4.1: manufacturer's product data for adhesives, including printed statement of VOC content.

Preferred Products

PolyVision Corporation
 AARCO Products, Inc.
 Best Rite Manufacturing
 ADP/Lemco, Inc.

MIRRORS (Division 8)**Design Criteria**

- Design mirror glass in limited sizes in consideration of breaking hazards.

Technical Standards

- Do not specify glass mirrors in public or student toilet rooms.
- Specify unbreakable, acrylic or polished stainless steel with concealed mounting.

Preferred Products

(None)

PLASTIC LAMINATE CABINETS & COUNTERTOPS (Division 6)**Design Criteria**

- Design and specify all custom casework to meet AWI "custom" Standard.
- Design outside corners of island countertops to have 3" minimum radius.
- Do not design post-formed countertop and backsplash or rolled countertop edge.

Technical Standards

- Specify all plastic laminate casework substrates to be particleboard or marine plywood in wet areas.
- Specify that particleboard is made with binders containing no added urea formaldehyde resins.
- Specify a backing sheet for all plastic laminate surfaces.
- Specify that all cut-outs in countertops be sealed.
- Specify that countertops and backsplashes be scribed to wall with sealant at joint.
- Specify scribe strips for adjusting plumbness of casework.
- Specify product shall be GREENGUARD Certified by the GREENGUARD Environmental Institute (GEI) and listed in the GREENGUARD Online Product Guide.
- Specify product that has recycled (post consumer, post industrial) content.
- Specify product that has been manufactured within 500 miles of project.
- Specify that documentation that composite wood contains no added urea-formaldehyde resins.
- Specify that material safety data sheets (MSDS) listing chemical components for each adhesive, sealant, and sealant primer be submitted.

- Specify that all adhesives and sealants applied on-site shall comply with the South Coast Air Quality Management District (SCAQMD Rule #1168) effective date of July 1, 2005 and rule amendment date of January 7, 2005.

Preferred Manufacturers

Poly Vision
LSI
National Wood/ School Specialty
Fischer Hamilton

PLASTIC LAMINATE LABORATORY COUNTERS and CABINETS (Division 6)**Design Criteria**

- Design laboratory reagent shelves to be 10" wide and removable, if concealing plumbing. Discuss possibility of specifying spring clips, in lieu of screws, with SDOP.

Technical Standards

- Specify solid resin countertops on Demonstration Table for chemical resistance.
- Consider one piece structural plastic drawers in lieu of built-up plywood drawer units.
- Specify hardwood edging for drawer and countertop edges. Do not specify self edging plastic laminate.
- Specify handles to be either stainless steel wire or ABS plastic pulls.
- Specify tamperproof screws for handles.
- Specify product shall be GREENGUARD Certified by the GREENGUARD Environmental Institute (GEI) and listed in the GREENGUARD Online Product Guide.
- Specify product that has recycled (post consumer, post industrial) content.
- Specify product that has been manufactured within 500 miles of project.
- Specify that documentation that composite wood contains no added urea-formaldehyde resins.
- Specify that material safety data sheets (MSDS) listing chemical components for each adhesive, sealant, and sealant primer be submitted.
- Specify that all adhesives and sealants applied on-site shall comply with the South Coast Air Quality Management District (SCAQMD Rule #1168) effective date of July 1, 2005 and rule amendment date of January 7, 2005.

Preferred Manufacturers

Poly Vision
LSI
National Wood/ School Specialty
Fischer Hamilton

Demonstration Tables:

Collegedale
Campbell Rhea
Diversified Wood

SHADES (Division 12)**Design Criteria**

- Design window shades to fill openings with not more than 1/4-inch clearance at jambs and 3/8-inch clearance at sill. Install shades level and plumb, mounted not less than 1-inch from face of exterior glass.
- Shades shall be provided at all exterior window locations and at interior locations where specified by the School District of Philadelphia.

Technical Standards

- Shades shall consist of non-PVC shade cloth, reclaimable and recyclable, durable, antimicrobial and flame retardant, off-white color, maximum width to be 72 inches. Shades shall be manually operated with cord pulls located at the center of the shade.
- Provide attic stock of ten (10) shades of the largest window size.

Preferred Products

Draper

WOOD SHELVING AND CIRCULATION DESK AT INSTRUCTIONAL MEDIA CENTER (IMC)

- Specify wood shelving at IMC to be solid wood construction throughout.

Technical Standards

- Specify product that has been certified by the FSC (Forest Stewardship Council)?
- Specify product that has been green guard certified.
- Specify product that has recycled (post consumer, post industrial) content.
- Specify product that has been manufactured within 500 miles of project.
- Specify that documentation that composite wood contains no added urea-formaldehyde resins.
- Specify that material safety data sheets (MSDS) listing chemical components for each adhesive, sealant, and sealant primer be submitted.
- Specify that all adhesives and sealants applied on-site shall comply with the South Coast Air Quality Management District (SCAQMD Rule #1168) effective date of July 1, 2005 and rule amendment date of January 7, 2005.

Preferred Products

Brodart
Palmiere
Russwood

SELECTIVE DEMOLITION (Division 2)**Design Criteria**

- Check locations where existing mechanical and electrical work pass through proposed demolition areas.
- Check perimeter walls to remain at demolition areas for existence and location of any mechanical and electrical work on either side.
- Do not retain partitions in demolition areas for the sake of retaining existing HVAC, plumbing, or electrical work unless absolutely necessary for continuity of service.
- Double check for load bearing walls or concealed columns.
- Assist school Principal or other SDOP personnel in identifying items to be demolished and salvaged as SDOP property:
- Before design work begins, identify any equipment, materials, or components suitable for reuse in the Project, including, but not limited to:
 - Existing old and new doors and hardware
 - Toilet partitions
 - Plumbing Fixtures
 - Lighting Fixtures
 - Doors
 - Frames
 - Hardware
 - Ceiling Tiles and Suspension System
 - Ceramic Tiles that may be needed for patching existing work to remain.
 - Ductwork
 - Grilles
 - Diffusers
 - Dampers

Identify items to be retained in the Contract Documents and items to be Contractor's salvage or SDOP salvage.

Preferred Products

(None)

02220 - Selective Demolition

Comments

When considering the scope of demolition in a project, the effect on adjacent areas should be kept in mind. This includes the occupied areas of the floors above and below, as well as occupancies as remote as other buildings. The disturbances of demolition are not as significant for Architectural components as they are for Mechanical and Electrical components where services, such as sanitary lines, risers and vents, electrical conduit, etc., passing through the demolition area must remain operational. Of particular concern are some items which may not be readily observable in the demolition area, such as over-ceiling plenums for HVAC return air, or the use of fire rated ceilings or wall systems.

The question of whether or not to save an existing partition or ceiling that contains mechanical or electrical components must be carefully evaluated for overall economic advantage in the entire scope of work, as well as consideration about disturbing adjacent occupancies.

Selective demolition decisions must always be made after a complete analysis and understanding of the building structural system, including the location of concealed columns, piers, and the extent of bearing walls.

Mechanical and electrical codes should be searched when evaluating existing systems and components within proposed demolition areas. What might appear to be adequate and serviceable components may in fact not meet current code standards and therefore not be worth saving. Also, the schematic adequacy of existing utility lines to serve proposed new uses and layout must be evaluated for feasibility.

Reuse of existing materials that are scheduled for demolition must be evaluated carefully by methods of true value engineering. Other than suitability of appearance or functional adequacy, one must approximate the age and remaining useful life of materials and components which otherwise become Contractor's salvage.

A mandatory site and building review is required of the design professional before commencing design work. Existing design drawings are made available to the design professional by SDOP but their accuracy with regard to actual existing conditions is not assured. Similarly, the Instructions to Bidders require them to perform a mandatory site visit to verify existing conditions.

EMBANKMENT (Division 2)**Design Criteria**

- Design cribbing construction rather than retaining walls where possible.

Preferred Products

(None)

Accessible Parking Spaces (Div 2)**Design Criteria**

- Comply with the ANSI 117 (American National Standards Institute).
- Provide a minimum of 1 accessible parking space or 2 percent of the total number of parking spaces required, whichever is greater.
- Locate accessible parking spaces on shortest accessible route of travel to an accessible building entrance.
- Do not provide accessible routes that cross drives or parking areas. If necessary, provide crosswalk, painted on pavement, plus signs designating pedestrian right-of-way.

Technical Standards

- Provide universal parking space or typical car/van parking space layout according to ANSI 117 guidelines plus sign with international symbol at each accessible parking space.
- Provide broom-finish concrete curb ramps, according to ANSI 117 guidelines, along accessible route.
- Design accessible route with dimensions and slopes according to ANSI 117 guidelines.
- Specify 4" wide Blue Pavement Markings for Accessible Parking spaces.

Preferred Products

See preferred pavement marking paints under G20 Vehicle Site Design-General.

ELEMENTARY SCHOOL ATHLETIC FIELDS (Div 2)**Design Criteria**

- If available land allows and Transfer Package specifies, provide grading only for 1 softball field and 1 multipurpose field where import of fill material is not required. Crown grade at center of field.
- Elementary School softball field radius is to be 180 – 200 feet.
- Elementary School multipurpose field size is to be 195 feet wide and 360 feet long.
- Design softball infield area according to athletic association standards.
- Irrigation of Baseball infield area, if provided, to use reclaimed rainwater.
- Confirm with the School District if playing fields are to be available for community use and if so design access, security, and accessories accordingly.

Technical Standards

- Provide grading of fields with a 1% to 1½% slope.
- Baseball backstop is to have a 17-foot, 6-inch overhang height and a 10-foot high by 20-foot wide back panel and 10-foot wide side panels. Backstop is to be located at a minimum of 25 feet and a maximum of 30 feet behind home plate.
- Provide Safety Release bases that include an attachment system that holds the bases in place during normal play but will dislodge when a runner slides into the base.
- For outfield fencing, provide 8 feet high chain-link with top rail protective pad (standard fence guard) between foul lines and foul poles at foul lines.
- Specify Grass Mix for athletic playing fields to be a combination of bluegrass and perennial ryegrass a minimum of 80% endophyte-enhanced turfgrass cultivars designed for playing fields.

Preferred Products

- Baseball Bases:
 - 1) Rogers Break away Base ® System
 - 2) Equivalent Safety Release bases that have been clinically proven to dramatically reduce injuries in both the baseball and softball arenas.

- Recycled content and materials are preferred for outdoor equipment such as the use of recycled plastic lumber in lieu of aluminum construction (Aluminum is a vandalism risk). Example sport benches and spectator stands can be made of recycled plastic lumber.

- For Sports and playing fields specify ground rubber from recycled tires as a soil additive, this increases the resiliency of the field thereby decreasing injuries, improves drainage, and enables better grass root structure.

HIGH SCHOOL ATHLETIC FIELDS (Div 2)**Design Criteria**

- If available land allows and Transfer Package specifies
- Plan athletic fields to be:
 - 1 baseball field
 - 1 softball field
 - 8 to 12 tennis courts
 - 8-lane, 400 meter running track
 - Football/ soccer field
 - Field events
 - 2 multipurpose fields.
- Provide cut and fill only for 1 softball field and 1 multipurpose field without top soil. Do not permit imported offsite fill material.
- Design site grading plan to avoid imported fill to the maximum extent possible. If imported fill is needed, specifications must require proof by submittal documents that only Pennsylvania Department of Environmental Protection “Clean Fill” is used.
- Crown grades at centers of fields.
- Provide a minimum of two (2) freeze proof hose bibs.

Technical Standards

- Provide grading of fields with a 1% to 1½% slope.
- High School Multi-purpose fields are to be 225 feet wide and 360 feet long.
- High School baseball field requirements:
 - Radii are to be 300 and 335 to 350 feet.
 - Infield is to be designed according to athletic association standards.
 - Backstop is to be 24 feet high, at a minimum of 60 feet behind home plate.
 - Protection fence is to be 12 feet high, chain-link, at 60 feet from baselines.
 - Outfield fencing is to be 8 feet high, chain-link, with top rail protective pad between foul lines and foul poles at foul lines.
 - Player benches for each team, set back from protection fence.

- High School Softball Field requirements:
 - Radius to be 185 feet to 300 feet.
 - a. 185 feet – 235 feet for female or male fast pitch.
 - b. 250 feet – 275 feet for female slow pitch.
 - c. 275 feet – 300 feet for male slow pitch.
 - Infield is to be designed according to athletic association standards.
 - Backstop is to have a 17-foot, 6-inch overhang height, a 10 foot high by 20 wide back panel, plus 10 foot wide side panels. Backstop is to be located a minimum of 25 feet and maximum of 30 feet behind home plate.
 - 12 foot high chain-link player protection fences.
 - Optional 8-foot high chain-link outfield fence, top rail protective pad, and foul poles.
 - Player benches for each team, set back from side fence line.
- High School running track/football field requirements:
 - 6 or 8 lane, 400 meter running track.
 - Track surfaces to be All weather rated.
 - Track radii adequate to accommodate football/soccer field.
 - Field to include high jump, long/triple jump, discus, and shot-put.
 - 4-foot high chain-link fence surrounding track with gates at center field and as needed for maintenance access.
 - Javelin and Discus will use multipurpose fields(s).
 - Scoreboards and spectator stands v (confirm project specific design capacity).
- High School tennis courts
 - provide 12' high chain link fence enclosure

Preferred Products

- Baseball Bases:
 - 1) Rogers Break away Base ® System

2) Equivalent Safety Release bases that have been clinically proven to dramatically reduce injuries in both the baseball and softball arenas.

- Recycled content and materials are preferred for outdoor equipment such as the use of recycled plastic lumber in lieu of aluminum construction (aluminum is a vandalism risk).
Example: sport benches and spectator stands.
- For track surfacing systems that use recycled ground rubber from recycled tires or Nike Grind.
- For sports and playing fields specify ground rubber from recycled tires as a soil additive, this increases the resiliency of the field thereby decreasing injuries, improves drainage, and enables better grass root structure.

Bike Racks (Division 2)**Technical Standards**

- Specify min. 2" nom., Sch. 40, ASTM A500 steel pipe.
- Specify galvanized finish on all components.
- Do not specify a powder coat finish unless directed by SDOP.
- Design and Specify rack to be set in concrete.
- Specify SDOP approved color if powder coated.

Preferred Products

Brandir International, Inc.
Colombia Cascade
Dero Bike Rack Company
Huntco Bike Racks

LEED REQUIREMENTS**Design Criteria**

- Specify bike racks that will comply with LEED for Schools (November 2007) Sustainable Sites Credit 4.2: Alternative Transportation- Bicycle Use.

LEED details

- LEED for Schools (November 2007) Sustainable Sites Credit 4.2: Alternative Transportation- Bicycle Use. In summary, the requirements are:
 - Quantity: provide secure storage for at least 5% of ALL building staff and students.(Note also that a minimum number of showers and changing areas must be made available in the building (or within 200 yards of the building entrance) for use by staff that commutes by bicycle. The minimum number is 0.5% of full time Equivalent (FTE) staff.

Important Note: the total number of staff and students used in calculating the number of bike racks and showers needed **MUST** be the same total number used for all other LEED related calculations.

- Location: Locate the bike racks within 200 feet of a main building entrance that will be used by students.
- Integrate the Bike Rack location in site circulation design: design paths that bicycles can travel along planned pathways that lead to the end of the school property in at least two (2) directions. The bike paths must not have any barriers such as locked gates.

BUS LOADING AND UNLOADING (Div. 2)**Design Criteria**

- Establish separate car and bus circulation.
- Design bus circulation so that buses do not have to back up.
- Design diagonal bus parking spaces at 12 feet to 13 feet wide by the length of a bus. Spaces are to be aligned at either a 45-degree or 60-degree angle to the curb in a “peel off” or “free access” arrangement.
- Design angled bus parking so that bus exit door will allow boarding access in front of the adjacent bus.
- Design all turning radii so bus can turn in just one maneuver.
- Locate bus parking close to main school entrance.
- Design a curbed sidewalk along the drop-off/pick-up lane and in front of the diagonal bus parking spaces.
- Design pavement and subsurface for required structural loads.

Preferred Products

(None)

CHAIN LINK FENCES (Division 2)

Design Criteria

- Do not provide barbed wire or razor ribbon at top of fence, unless directed by SDOP.
- Design perimeter security fencing to be 6 feet high, except at athletic areas design fencing to be coordinated with field requirements.
- Design chain link fences over 5 feet high shall have top, middle and lower rail.
- Consider inclusion of a paving strip below fences to facilitate mowing and cleaning.
- Design and specify footings and subsurface preparation.
- For athletic fields, generally design 10' to 12' high fences. Refer to Athletic Fields standards. Coordinate and confirm project- specific fencing requirements for Athletic facilities with School District.
- Note site specific zoning requirements. Generally, unless front fence is limited to 4' height, and sides limited to 6' to 8', a zoning variance will be required.

Technical Standards

- Specify 2 1/8", 6 ga. fabric mesh.
- Specify galvanized finish on all components. Do not specify a paint finish unless directed by SDOP.
- Specify fence fabric to be knuckled at both selvages.
- Specify all fabric on fences to be attached to poles and rails with welded ties.
- Specify heavy duty hinges on gates.
- Specify SDOP approved color if fence is painted.

Preferred Products
(None)

CHAIN LINK GATES (Division 2)**Technical Standards**

- Specify same finish for gate components as for fence.
- Provide hasps for padlocks at all gates.

Preferred Products

(None)

EMERGENCY VEHICLE CIRCULATION (Div 2)**Design Criteria**

- Where vehicular drives are not included, provide paved walks or other surfaces suitable to accommodate emergency vehicles.
- Review fire vehicle circulation and construction with the Philadelphia Fire Department.
- Provide hinged bollards in pavement where emergency access path meets vehicular drive. Space bollards at a minimum of 5 feet on center.

Preferred Products

(None)

EXTERIOR SIGNS (Division 10)

- Design and specify the name of the school as pin-mounted cast aluminum letters.
- Signage to comply with Philadelphia Zoning Code. In most cases a ZBA variance will be needed for New School Signs. Code limits to 15 square feet.

Preferred Products

(None)

FLAGPOLES (Division 10)**Design Criteria**

- As an alternative to free-standing flagpoles, consider designing flag holders mounted on exterior walls near the entrance with designated separate access from second story. (By “designated separate access” it is meant that access should not be through a classroom).
- All new Schools must have at least one flagpole.
- All football stadiums shall have a flagpole.
- Recycled content for foundation and pole.

Technical Standards

- Specify appropriate flagpole height according to flag size.
- Specify flagpole material and type as tapered aluminum.

Preferred Products

American Flagpole
Eder Flag Manufacturing Company, Inc.
Baartol Company, Inc.
Concord Industries, Inc.
Ewing International
Lingo Inc.; Acme Flagpole Div.

FLEXIBLE PAVEMENT (Division 2)

Design Criteria

- Design and specify bituminous concrete pavement to consist of a 6" stone base course, a 1" binder course, and a 1" finish course, all as a minimum standard. Consider higher standards where poor soil conditions require, and only at driving aisles and roadways, if possible.
- Do not design or specify bituminous curbs.
- Specify 1/4" per foot minimum slope.
- Follow City of Philadelphia Streets Department standards and regulations where public streets are cut and patched by Project work.
- Do not disturb earth for repaving, unless structural repair of subsurface is required. For non-structural repair, mill and recoat at most.
- Use pervious pavement systems (including subsurface design for proper infiltration) if necessary to meet Philadelphia Water Department and Philadelphia Storm water Ordinance requirements.

Technical Standards

- Specify the use of recycled material for flexible pavement. Use of Crumb Rubber (from scrap tires) and reclaimed asphalt pavement (RAP) can be used according to Section 5.7 of "The Compendium of Environmental Stewardship Practices in Construction and Maintenance", Recycling in the Aggregate Industry and Pavement Construction published by The Center for Environmental Excellence by the American Association of State Highway and Transportation Officials (AASHTO). The specifications of PennDOT Strategic Recycling Program may also be referenced at the link below.

Refer to Section 5.7 of the AASHTO manual here:

http://environment.transportation.org/environmental_issues/construct_maint_prac/compendium/manual/5.7.aspx.

Refer to the relevant sections of PennDOT Publication 408 here:

<http://www.dot.state.pa.us/Internet?Bureaus?pdDesign.nsf/infoSpecifications?OpenForum>.

Preferred Products

See G20 Vehicular Site Design- General for preferred pavement marking paint.

LAWNS AND GRASSES (Division 2)**Design Criteria**

- Design all areas landscaped with grass lawn to have a minimum width of four (4) feet. (Note: this is to accommodate mowing, so plans for mower access should also be considered.)

Technical Standards

- Specify sod only in areas immediately near the building entrance or when Project occupancy occurs during dormant growth period.
- Specify seeding in all areas other than the building entrance and when Project occupancy occurs during active growth season.
- Lawns shall not include irrigation systems.
- Landscape Architect to specify drought resistant seed mixes of specific turf types and cultivars according to lawn use and site specific factors such as drainage, shade, and foot traffic. Perennial Rye and Tall Fescue mixes are preferred.
- Landscape architect to specify preparation of areas to be seeded.
- Landscape Architect to specify schedule of seeding and initial care and maintenance schedule including watering frequency and when full access to newly seeded area is allowed.
- Specify a suitable ground cover at all slopes greater than 2:1. Consider Crown Vetch for erosion control.
- To avoid contractor substitution with inappropriate, lower quality seeds, designer may consider the following specification language: Materials proposed as substitutions to proprietary seeds listed in the specifications shall be accompanied by complete descriptions and any other pertinent information such as NTEP trial data necessary to determine equality.

Preferred Products

- Regionally supplied Seed Mixes custom designed for Philadelphia microclimate including:
 - 80% Tall Fescue Cultivars with a minimum of 50% either Certified Inferno or Jaguar 4G, and 30% either Quest or Rembrandt.
 - 20% Perennial Rye Cultivars with a minimum of 30% Revenge, Charismatic

Example Product:

Advantage Mix Tall Fescue/Rye Mix (80/20) form Fisher and Son Company Inc.

References:

The National Turfgrass Evaluation Program - **NTEP.ORG**

PEDESTRIAN CIRCULATION (Div 2)**Design Criteria**

- Design pedestrian walk widths to be a minimum of 8 feet and a maximum of 12 feet, from major drop-off drives to major entrances.
- Design minor connecting walks to be a minimum of 5 feet wide.
- Verify that accessibility is addressed at drop-offs and sidewalks.

Technical Standards

- Walks are to be reinforced concrete, minimum 4-inches thick, with light broom finish perpendicular to slope.
- Walk slope is to be a minimum of 1 percent and a maximum of 1:20. If walk exceeds 1:20, it is to be designed as a ramp.
- Slope all walks to drain into curb or grassy areas.

Preferred Products

(None)

PLAQUES (Division 10)

Design Criteria

- Identify location and information content of bronze dedication plaque in consultation with SDOP.

Preferred Products

(None)

RAMPS (Div 2)**Design Criteria**

- All ramps must be contained within property lines
- Verify requirements of the Philadelphia Streets Department regarding ramps at sidewalks.
- Design Sidewalks and pedestrian ramps to accommodate Fire Rescue stretchers.

Technical Specifications

- Refer to ANSI 117 for detailed design requirements such as maximum slope, maximum rise, minimum width, landing design, railings, etc.
- Ramp surface is to be broom finish perpendicular to slope.

Preferred Products

(None)

RIGID PAVEMENT (Division 2)

Design Criteria

- Design paving in front of dumpsters and loading dock to be reinforced Portland cement concrete.
- Design concrete curbs only at walkways, entrances, exit areas, and areas of high visibility.
- Design concrete entryways with a fibrous joint between adjacent concrete slabs to prevent freeze/thaw uplift of slab at doorways.
- Design bus loading and unloading areas to be for structural heavy duty use.
- Design entryway slabs to extend 4" beyond entry door frames on each side, extend out 5 feet, and taper in to meet the entry walk slab.

Technical Standards

- Specify all site concrete, other than driveways and service truck routes, to be at least 3,500#.
- Design subsurface construction to handle concrete design loads.
- Specify rigid paving materials with a solar reflective index (SRI) of at least 29 (as per LEED for Schools Credit SSc7.1- Heat Island Effect: non Roof.)
- At all entryways, require construction joints (pour stops)
- At all entryways, slope concrete away from doors.
- Specify fibrous joint material for construction joints.
- Specify minimum recycled content for rigid pavement mixes. Require submittal and pre-approval of Design Mixes for all related project work.
Note: Per the Portland Cement Association, it is generally accepted that when natural sand is used, up to 30% of natural crushed stone aggregate can be replaced with coarse recycled aggregate without significantly affecting any of the mechanical properties of the concrete.

Reference: http://www.cement.org/tech/cct_aggregates_recycled.asp.

- Design and specify a sanitary drain at all dumpster pads.

Preferred Products
(None)

SERVICE DRIVE (Div. 2)

Design Criteria

- Waste Dumpsters Area and Approach: Design pavement as required for structural loads.
(Considering standard waste trucks weighs 50,000 pounds or 25 tons).
- Design dumpster pad, and maneuvering area(s) to heavy duty highway standard rating to accommodate up to 25 ton vehicles.
- Provide T-turn with 50-foot truck maneuvering radius.
- Isolate service areas from Bus Loading and Unloading location.

Technical Standards

- Structural Heavy Duty Concrete pad shall be a minimum of 8" thick.

Preferred Products

Refer to products under sections for flexible and rigid pavements.

SIDEWALKS and PEDESTRIAN RAMPS (Division 2)**Design Criteria**

- Design pedestrian ramps that encroach on sidewalks according to special design requirements of the Philadelphia Department of Streets, outlined as follows:

The applicable standard is CABO/ANSI A117.1, and includes:

- Slope no greater than 1:12
 - Clear width of 36" minimum.
 - Level landings at bottom and top of each run.
 - Landings at least as wide as the widest ramp run leading to it.
 - Clear landing length of 60" minimum.
 - Ramps that change direction must have landing measuring 60" X 60", minimum.
 - Surface of ramps shall be broom finished perpendicular to slope.
 - Ramps with a rise greater than 6 ", or a run longer than 72", must have handrails.
-
- Design sidewalks and pedestrian ramps to accommodate Fire Rescue stretchers.

Preferred Products

(None)

02775 - Sidewalks and Pedestrian Ramps

Comments

Design Planning

Pedestrian ramps located on public footways are subject to special design requirements as determined by the Philadelphia Department of Streets and administered through the building permit process of the Department of Licenses and Inspections.

Since utility conduits and pipes are located beneath sidewalks, throughout the city, installing a ramp on the public footway should be the last alternative explored. If a ramp is proposed that would block access to such utilities, and acceptable designs or materials cannot be utilized, the Streets Department must recommend that a building permit be denied. Even if approved by the Streets Department, a ramp that encroaches on the public right-of-way is subject to removal or dismantling if any repairs to the infrastructure are necessary. For this reason, utilizing materials that can be easily removed and replaced should be a serious consideration.

Constructing a ramp within the property line and not encroaching on the public right-of-way is the preferred option. Where ramps are not feasible, a wheelchair lift may be permitted by the Department of Licenses and Inspections, through the Accessibility Advisory Board.

City Planning Commission

If a proposed ramp alters the facade of a property located within the Center City District, an exception to the applicable code must be secured from the City Planning Commission. A building permit will not be issued by the Department of Licenses and Inspections without such an exception being obtained.

Historical Commission

If a proposed ramp affects a historic property, approval must be obtained from the Historical Commission.

Accessibility Advisory Board

If a proposed ramp does not meet the design requirements of applicable codes and standards, a variance must be obtained from the Accessibility Advisory Board.

Emergency Services Access to Facilities

Fire Rescue and other emergency medical services must have easy ingress to and egress from buildings. Wheelchairs and stretchers must be able to gain quick access to ramps.

STAFF PARKING (Div. 2)**Design Criteria**

- Design parking for each staff member plus spaces for part-time staff and student teachers.
(Note LEED Details).
- Provide a minimum of 8 parking spaces near building receiving area for Food Service and Custodial Staff. (Note LEED Details).
- Locate staff parking near or contiguous with visitor parking or bus parking, where possible, for economy of paving.

LEED Details:

- The maximum number of parking spaces is limited according to LEED for Schools (November 2007) Sustainable Sites Credit 4.4 (See G20 Vehicle Site Design- General).

Preferred Products

Pavement Marking Paint- See G20 Vehicle Site Design- General

VEHICULAR DROP-OFF/PICK-UP DRIVE (Div 2)**Design Criteria**

- Maintain separation from bus circulation.
- Design layout for one-way traffic.
- Locate near main building entrance, close to administration office.
- Design pavement for structural standard duty, unless busses or trucks are anticipated to use.
- Design driveway width to be a minimum of 24 feet.

Preferred Products

(None)

VEHICULAR SITE DESIGN – GENERAL**Design Criteria**

- Design parking spaces to be 9' X 18' minimum.
- Check Philadelphia Zoning Code for required number of parking spaces, dimensions, and other possible requirements.
- Address code requirements for ADA parking, such as number, location and special spacing of ADA parking spaces
- Design double loaded aisles in parking areas, to greatest extent possible.
- Design adequate turning radii for service vehicle access to loading dock, trash dumpsters, etc.
- Design conventional curbs without integral gutters.
- Design planting areas as paving cut-outs with concrete edging.
- Indicate wheel stops only at locations where necessary to protect planting, buildings, or walkways without curbs.
- Consider use of bollard barriers to prevent vehicular traffic from entering upon non-vehicular pavement areas.
- Design loading dock overhangs to accommodate height of tallest vehicle anticipated.
- Design bus parking area with over-striping for after-school, special event parking.
 - Car striping to be 4-inch wide white lines
 - Bus striping to be 4-inch wide yellow lines.

STAFF PARKING (Div. 2)

Design Criteria

- Design parking for each staff member plus spaces for part-time staff and student teachers.
- Provide a minimum of 8 parking spaces near building receiving area for Food Service and Custodial Staff.
- Locate staff parking near or contiguous with visitor parking or bus parking, where possible, for economy of paving.

VISITOR PARKING

Design Criteria

- Provide number of visitor parking spaces at 2% - 5% of the student population.
- Locate near main building entrance, close to administration office.

LEED REQUIREMENTS

Design Criteria

- Limit the Total Number of Parking spaces to meet requirements of Sustainable Sites Credit 4.4. See details below.

Technical Standards

- Specify Traffic Marking Coatings that meet the GPS-1-07 Green Performance Standard of the Master Painters Institute, Inc.
- Specify that newly placed driveway or parking surfaces, whether asphalt or concrete, shall NOT be marked with permanent pavement parking prior to 30 calendar days after placement of the final surface, unless the Manufacturer of the Traffic Marking Coatings allows otherwise.

Preferred Products

- 100% Acrylic Latex Zone Marking Paint
- Acrylic Latex Zone Marking Paint

Examples:

- Product 0.0TM0226 SetFast® Acrylic Waterborne Traffic Marking Paint White, Sherwin-Williams Latex Zone Marking Traffic Paint (072), MAB
- 702-00 White Pro Finish Latex Zone Marking Paint, Graham Paint & Varnish Co.
- 4800 Series Traffic Paint Water Reducible Acrylic, ICI Paints
- AACT ACRYLIC Waterborne, Safety Coatings, Inc.

LEED Details

LEED for Schools (November 2007) Sustainable Sites Credit 4.4 limits the number of onsite parking spaces to reduce pollution and/or land development impacts from individual automobile use.

OPTION 1

Size parking capacity to:

- 1) Do not exceed the minimum local zoning requirements,

AND,

- 2) Provide *preferred parking* for carpools or vanpools for 5% of the total provided parking spaces.

OR

OPTION 2

- 1) Provide no new parking.

OR

OPTION 3

- 1) For projects that have no minimum local zoning requirements, provide 25% fewer parking spaces than the applicable standard listed in the 2003 Institute of Transportation Engineers (ITE) "Parking Generation" study (at www.ite.org).

"Preferred parking" refers to the parking spots that are closest to the main entrance of the project (exclusive of spaces designated for handicapped).

G20 Site Improvements – Parking and Vehicular

VEHICULAR SITE DESIGN – GENERAL

ID	Designer Sign Off (AOR to Initial)	Design Criteria
1.	Yes _____	Design parking spaces to be 9' X 18' minimum.
2.	Yes _____	Check Philadelphia Zoning Code for required number of parking spaces, dimensions, and other possible requirements.
3.	Yes _____	Address code requirements for ADA parking, such as number, location and special spacing of ADA parking spaces
4.	Yes _____	Design double loaded aisles in parking areas, to greatest extent possible.
5.	Yes _____	Design adequate turning radii for service vehicle access to loading dock, trash dumpsters, etc.
6.	Yes _____	Design conventional curbs without integral gutters.
7.	Yes _____	Design planting areas as paving cut-outs with concrete edging.
8.	Yes _____	Indicate wheel stops only at locations where necessary to protect planting, buildings, or walkways without curbs.
9.	Yes _____	Consider use of bollard barriers to prevent vehicular traffic from entering upon non-vehicular pavement areas.
10.	Yes _____	Design loading dock overhangs to accommodate height of tallest vehicle anticipated.
11.	Yes _____	Design bus parking area with over-striping for after-school, special event parking. <input type="checkbox"/> Car striping to be 4-inch wide white lines <input type="checkbox"/> Bus striping to be 4-inch wide yellow lines.

STAFF PARKING (Div. 2)

ID	Designer Sign Off (AOR to Initial)	Design Criteria
12.	Yes _____	Design parking for each staff member plus spaces for part-time staff and student teachers.
13.	Yes _____	Provide a minimum of 8 parking spaces near building receiving area for Food Service and Custodial Staff.
14.	Yes _____	Locate staff parking near or contiguous with visitor parking or bus parking, where possible, for economy of paving.

VISITOR PARKING

ID	Designer Sign Off (AOR to Initial)	Design Criteria
15.	Yes _____	Provide number of visitor parking spaces at 2% - 5% of the student population.
16.	Yes _____	Locate near main building entrance, close to administration office.

LEED REQUIREMENTS

ID	Designer Sign Off (AOR to Initial)	Design Criteria
17.	Yes _____	Limit the Total Number of Parking spaces to meet requirements of Sustainable Sites Credit 4.4. See details below.

Technical Standards

- Specify Traffic Marking Coatings that meet the GPS-1-07 Green Performance Standard of the Master Painters Institute, Inc.
- Newly placed driveway or parking surfaces, whether asphaltic or concrete, shall NOT be marked with permanent pavement parking prior to 30 calendar days after placement of the final surface.

Preferred Products

1. 100% Acrylic Latex Zone Marking Paint

Examples:

- (1) Product 0.0TM0226 SetFast® Acrylic Waterborne Traffic Marking Paint White, Sherwin-Williams Latex Zone Marking Traffic Paint (072), MAB
- (2) 702-00 White Pro Finish Latex Zone Marking Paint, Graham Paint & Varnish Co.
- (3) 4800 Series Traffic Paint Water Reducible Acrylic, ICI Paints
- (4) AACT ACRYLIC Waterborne, Safety Coatings, Inc.

LEED Details

LEED for Schools (April 2007) Sustainable Sites Credit 4.4 limits the number of onsite parking spaces to reduce pollution and/or land development impacts from individual automobile use.

OPTION 1

Size parking capacity to:

- 1) Do not exceed the minimum local zoning requirements,

AND,

| 2) Provide *preferred parking* for carpools or vanpools for 5% of the total provided parking spaces.

| OR

| OPTION 2

| 1) Provide no new parking.

| OR

| OPTION 3

| 1) For projects that have no minimum local zoning requirements, provide 25% fewer parking spaces than the applicable standard listed in the 2003 Institute of Transportation Engineers (ITE) "Parking Generation" study (at www.ite.org).

| *"Preferred parking" refers to the parking spots that are closest to the main entrance of the project (exclusive of spaces designated for handicapped).*

G20 Site Improvements – Parking and Vehicular

VEHICULAR SITE DESIGN – GENERAL

ID	Designer Sign Off (AOR to Initial)	Design Criteria
1.	Yes _____	Design parking spaces to be 9' X 18' minimum.
2.	Yes _____	Check Philadelphia Zoning Code for required number of parking spaces, dimensions, and other possible requirements.
3.	Yes _____	Address code requirements for ADA parking, such as number, location and special spacing of ADA parking spaces
4.	Yes _____	Design double loaded aisles in parking areas, to greatest extent possible.
5.	Yes _____	Design adequate turning radii for service vehicle access to loading dock, trash dumpsters, etc.
6.	Yes _____	Design conventional curbs without integral gutters.
7.	Yes _____	Design planting areas as paving cut-outs with concrete edging.
8.	Yes _____	Indicate wheel stops only at locations where necessary to protect planting, buildings, or walkways without curbs.
9.	Yes _____	Consider use of bollard barriers to prevent vehicular traffic from entering upon non-vehicular pavement areas.
10.	Yes _____	Design loading dock overhangs to accommodate height of tallest vehicle anticipated.
11.	Yes _____	Design bus parking area with over-striping for after-school, special event parking . <input type="checkbox"/> Car striping to be 4-inch wide white lines <input type="checkbox"/> Bus striping to be 4-inch wide yellow lines.

STAFF PARKING (Div. 2)

ID	Designer Sign Off (AOR to Initial)	Design Criteria
12.	Yes _____	Design parking for each staff member plus spaces for part-time staff and student teachers.
13.	Yes _____	Provide a minimum of 8 parking spaces near building receiving area for Food Service and Custodial Staff.
14.	Yes _____	Locate staff parking near or contiguous with visitor parking or bus parking, where possible, for economy of paving.

VISITOR PARKING

ID	Designer Sign Off (AOR to Initial)	Design Criteria
15.	Yes _____	Provide number of visitor parking spaces at 2% - 5% of the student population.
16.	Yes _____	Locate near main building entrance, close to administration office.

LEED REQUIREMENTS

ID	Designer Sign Off (AOR to Initial)	Design Criteria
17.	Yes _____	Limit the Total Number of Parking spaces to meet requirements of Sustainable Sites Credit 4.4. See details below.

Technical Standards

- Specify Traffic Marking Coatings that meet the GPS-1-07 Green Performance Standard of the Master Painters Institute, Inc.
- Newly placed driveway or parking surfaces, whether asphaltic or concrete, shall NOT be marked with permanent pavement parking prior to 30 calendar days after placement of the final surface.

Preferred Products

1. 100% Acrylic Latex Zone Marking Paint

Examples:

- (1) Product 0.0TM0226 SetFast® Acrylic Waterborne Traffic Marking Paint White, Sherwin-Williams Latex Zone Marking Traffic Paint (072), MAB
- (2) 702-00 White Pro Finish Latex Zone Marking Paint, Graham Paint & Varnish Co.
- (3) 4800 Series Traffic Paint Water Reducible Acrylic, ICI Paints
- (4) AACT ACRYLIC Waterborne, Safety Coatings, Inc.

LEED Details

LEED for Schools (November 2007) Sustainable Sites Credit 4.4 limits the number of onsite parking spaces to reduce pollution and/or land development impacts from individual automobile use. See G20 - Site Improvements **Vehicular Site Design – General** for details.

VEHICULAR SITE DESIGN - GENERAL**Design Criteria**

- Design adequate turning radii for service vehicle access to loading dock, trash dumpsters, etc.
- Design loading dock overhangs to accommodate height of tallest vehicle anticipated.
- Design double loaded aisles in parking areas, to greatest extent possible.
- Design parking spaces to be 9' X 18' minimum. Check ANSI and other code requirements.
- Design conventional curbs without integral gutters.
- Design planting areas as paving cut-outs with concrete edging.
- Indicate wheel stops only at locations where necessary to protect planting, buildings, or walkways without curbs.
- Consider use of bollard barriers to prevent vehicular traffic from entering upon non-vehicular pavement areas.

Preferred Products

(None)

VISITOR PARKING**Design Criteria**

- Locate near main building entrance, close to administration office.
- Design parking spaces to be 9 feet wide X 19 feet long.
- Check Philadelphia Zoning Code for required number of parking spaces, dimensions, and other possible requirements.
- Design bus parking area with over-striping for after-school, special event parking.
 - Car striping to be 4-inch wide white lines
 - Bus striping to be 4-inch wide yellow lines.
- For special visitor parking, consider grass pavers or other pervious surfacing that can serve as non-paved overflow parking.

Technical Standards

- Provide number of visitor parking spaces at 2% - 5% of the student population; however, also consider maximum number of parking capacity limits according to LEED for Schools (November 2007) Sustainable Sites credit 4.4 (see G20 Vehicle Site Design- General).

Preferred Products

Pavement Marking Paint- See G20 Vehicle Site Design- General.

PHILADELPHIA SCHOOL DISTRICT TELECOMMUNICATIONS
SYSTEM GUIDELINE SPECIFICATION

Dated February 25th, 2005

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PART 1 GENERAL

1.1 FORWARD

- A. The following specification and its associated drawings are typically intended for the installation of telecommunications systems in a new facility. They are intended to provide a set of instructions and materials needed to install a system in primarily new and/or future facilities, within parameters set by industry standards and by the SDP IT Dept. However, the design guideline specifications contained herein can also be applied to renovation projects, with discretion applied by the architect and engineer to meet the guidelines stated herein in this document. The information is modular in nature. Each facility will have one or more of each of the modules discussed. The following systems are included in the Guideline Specifications:
1. Structured Cabling Systems
 2. Pathways and Spaces
 - a. Typical Room Layouts
 3. Telecom Closets
 4. Entrance Facilities
 5. CATV Systems
 6. Public Address & Master Clock
 7. Audio/Visual Systems
 8. Sound Systems
 9. PBX Telephone System
 10. Data Networking System
 - a. Wireless Networking System
- B. Some of the information contained in the following is directed to the owner's architects, electrical, mechanical, and/or structural engineers. This information points toward ideal conditions and may vary from site to site to work around actual conditions.

1.2 DESIGN

- A. Methodology: Attached to this document are standard "modules" for typical areas of a school or facility, and the typical design of the Systems. Each project (or projects) shall have a scope associated with the specifics of the work involved, and a separate set of Telecommunications plans and details ("T" Drawings) of the facility and separate Telecommunications Specifications that adhere to these technical standards. The Architect/Engineer shall provide the documents as listed below that will detail his/her general design, based on the building conditions and the scope of work.
- B. Floor Plans: Provide floor plans for owner review showing outlet locations with an indication of outlet type for each system, based upon the guidelines and modules. "T" drawing Floor plans shall be coordinated with architectural and electrical power plans and shall be produced at the same scale as the electrical power plans. Plans shall also indicate the location of all IDFs, the MDF, the Server Room, the Entrance Facilities, and the Service Areas for all IDF's/MDF's. The plans shall indicate the locations of all wall cores/sleeves and floor cores/sleeves, cable chases, all cable trays, entrance facility conduit, and general routing of backbone fiber/copper cables and horizontal drop copper cables.
- C. Terminal Elevations: Provide details showing terminal block and backboard elevations including all cable terminals, spaces for equipment, equipment racks, and station cable routing. Communications equipment closets (IDF's and MDF and Server Room and Entrance Facilities) shall be arranged to maximize the utility and growth potential available in spaces shown on the floor plans. Terminal elevations shall be included in the contract documents and shall show additional detail as indicated herein, and per project specifics. Reference the typical elevations shown within.
- D. Outlet Locations (Voice/Data/CATV/Audio-Visual): Provide to meet the guidelines contained herein for all room "modules" and system guideline specifications.
- E. System Riser Diagrams shall be provided for the data, voice, video (CATV) systems, telecom grounding, public address, master clock, audio/visual, special systems(as required) and sound systems; data, voice, and CATV shall show backbone cabling/routing and typical drops.
 - 1. Riser Diagrams shall be shown by building elevations based upon the number of floors and where telecom rooms and entrance facilities are located.
- F. Structured Cabling Systems :
 - 1. All horizontal drops for voice and data shall be Cat. 6(minimum) copper.
 - a. Type CMP unless returns are ducted
 - b. From drop locations to IDF's/MDF
 - 2. All horizontal drops for CATV shall be Series 6 (RG-6), minimum size.
 - a. Type CMP unless returns are ducted
 - b. From drop locations to IDF's/MDF

- c. All voice backbone shall be a minimum of 100 Pair Cat. 3. {Note, see e.}
 - d. From IDF's to the MDF
 - e. From MDF to each EF
 - f. From the MDF to the Server Room
 - g. Type CMP unless returns are ducted
 - h. The designer has the option to provide Cat. 5/5e power sum cable for the voice backbone, four 25 pair cables in lieu of the 100 pair Cat. 3. In this case the designer/contractor must also provide Cat. 5/5e rated 110 terminations at both ends.
3. All horizontal fiber drops shall be 6SM/6MM hybrid; SM 8.3μ micron, MM 50μ micron:
- a. From Computer Labs & Tech Labs (cabinet) to closest IDF
 - b. From Principals Conference Room (wall mounted FO outlet) to closest IDF
 - c. From Teachers Lounge (wall mounted FO outlet) to closest IDF
 - d. From the IMC/Media Center (cabinet) to the closest IDF
 - e. Type CMP unless returns are ducted
 - f. All Fiber Backbones shall be a minimum of 24/24 Hybrid; 24 SM (8.3μ micron) and 24 MM (50μ micron)
 - g. IDF'S to MDF
 - h. Entrance Facility Room(s) to the MDF
 - i. MDF to the Server Room
 - j. Type CMP unless returns are ducted
4. Entrance Facility (EF) Conduits-All 4"
- a. Four from EF-1 to utility pole-shall be PVC SHD 40
 - b. Four from EF-1 to the MDF-shall be RGS or IMC only
 - c. Two from EF-2 to utility pole- shall be PVC SHD 40 *
 - d. Two from EF-2 to the MDF-shall be RGS or IMC only *

*** Only for schools on the main fiber rings that require per the SDP IT DEPT**

Note *: EF-2 is for a dual entrance, and diverse path to the dual entrance EF from the utility pole

1.3 APPLICABLE STANDARDS

- A. EIA/TIA-569A-1 to A-7. "Commercial Building Standard for Telecommunications Pathways and Spaces."

- B. EIA/TIA-568-B.1 & B.1-1; B.2, B-2.2, B-2.3; B.3. "Commercial Building Telecommunication Standard."
- C. EIA/TIA-455-61. "FOTP-61, Measurement of Fiber or Cable Attenuation Using An OTDR."
- D. ANSI/TIA/EIA-606. "The Administration Standard for the Telecommunications Infrastructure of Commercial Building."
- E. ANSI/TIA/EIA-607-A. "Commercial Building Grounding and Bonding Requirements for Telecommunications."
- F. TIA/EIA 492AAAB "Detail Specification for 50µm Core Diameter/125µm Cladding Diameter Class Multi-Mode Optical Fibers"
- G. TIA/EIA 492AAAC-A "Detail Specification for 850-nm Laser Optimized 50-µm Core Diameter/125µm Cladding Diameter Class 1a Graded Index Multi-Mode Optical Fibers"
- H. IEEE 802.3 "Carrier Sense Multiple Access With Collision Detection," and all applicable supplements a through af.
 - 1. IEEE 802.3u-100 Base T/100-Base-TX, Fast Ethernet
 - 2. IEEE 802.3z-Gigabit Ethernet
 - 3. IEEE 802.3 ab-1000 Base T
 - 4. IEEE 802.3ae-10 Gigabit Ethernet
- I. Electrical Code Compliance: Comply with applicable local and code requirements of the authority having jurisdiction.
- J. NFPA-70-NEC Compliance: Comply with NEC requirements as applicable to construction, installation and color coding of both power type wires/cables and control/signal transmission media.
- K. UL Compliance: Comply with applicable requirements of UL Standards 83, "Thermoplastic-Insulated Wires and Cables," 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors," and UL 910, "Test Method for Fire and Smoke Characteristics of Cables Used in Air-Handling Spaces." Provide products which are UL-listed and labeled.
- L. NEMA/ICEA Compliance: Comply with NEMA/ICEA Stds Pub/No's WC-5, "Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy," and WC30, "Color Coding of Wires and Cables," pertaining to control and signal transmission media.
- M. ASTM Compliance: Comply with applicable requirements of D-2219 and D-2220. Provide copper conductors with conductivity of not less than 98% at 20°C (68°F).
- N. FCC Compliance: Comply with U.S. Federal Communications Commission Class 8 standard for allowable radiation from network equipment and wiring.

- O. Internet Networking Standards: Network hardware and software shall be able to communicate with the Internet and provide for the creation of IP based networks for the district. Supplied hardware and software shall comply with the following standards and RFC's as appropriate.
 - 1. MIL-STD - 1777, RFC 971 - Internet Protocol
 - 2. MIL-STD - 1778, RFC 793 - Transmission Control Protocol
 - 3. MIL-STD - 1780, RFC 959 - File Transfer Protocol
 - 4. MIL-STD - 1781, RFC 821 - Simple Mail Transfer Protocol
 - 5. MIL-STD - 1782, RFC 854 - TELNET Protocol
 - 6. RFC 950 - Internet Standard Subnetting Procedure
 - 7. RFC 1140 - Official Protocol Standards
 - 8. RFC 1156 - MIB Base for IP Networks
 - 9. RFC-1213 - MIB-II
 - 10. RFC-1757 - Remote Monitoring(RMON)
 - 11. RFC 1157 - Simple Network Management Protocol
 - 12. RFC 1720 - TCP/IP, OSI Compliant
 - 13. RFC 1918 - Address Allocation for Private Subnets
 - 14. RFC 1583 - OSPF, Version II
 - 15. RFC 1723 - RIP -II
- P. NECA (National Electrical Contractor's Association) Standard of Installation.
- Q. BICSI TDM Manual, latest edition
- R. BICSI LAN Design Manual, latest edition
- S. BICSI Cabling Installation Manual, latest edition

1.4 SPACE(S) GUIDELINES

- A. THE MDF AND SERVER ROOM MUST BE LOCATED ABOVE GRADE
- B. EF's (ENTRANCE FACILITIES) SHALL BE BELOW GRADE
- C. ALL IDF'S SHALL SERVE THE FLOORS THEY ARE LOCATED ON ONLY-EACH FLOOR MUST HAVE AN IDF ('S) LOCATED ON THAT FLOOR; IF NECESSARY MULTIPLE IDF'S TO MEET THE BICSI 90 METER GUIDELINES
- D. IDF'S SHALL BE STACKED AND PREFERRED IN THE CENTER OF THE BUILDING

- E. MS AND HS- MDF SHALL BE 20'X12' AS SHOWN HEREIN, SERVER ROOM SHALL BE 20'X12' AS SHOWN HEREIN; ALL IDF'S SHALL BE 10'X10' AS SHOWN HEREIN, EF SHALL BE MINIMUM 8'X8'
- F. ES- MDF AND SERVER ROOM (COMBINED) SHALL BE 20'X12' AS SHOWN HEREIN; ALL IDF'S SHALL BE 10'X10' AS SHOWN HEREIN, EF SHALL BE MINIMUM 8'X 8'
- G. Entrance Facility Room (EF): Room shall be a separate room, at least 8'-0" by 8'-0". This area shall locate the incoming utility surge protection for copper and catv, and the demarcation for any fiber based data services. A backboard of at least 4' by 4' shall be dedicated to CATV service demarcation; a backboard of 4' x 4' shall be dedicated to incoming telephone service terminals and lightning protection and demarcation; a third backboard of 4' x 4' shall be dedicated to incoming fiber based services for the SDP WAN. A TGMB shall be provided, locate on the outside wall.

1.5 DROP COUNTS

- A. Data Drops (all Cat. 6 minimum) per room type shown on "modules"-typical classroom shall have four data drops on each of three walls; with the exception of ES's which require four data drops on one wall only. *{Note: any data drop can be used for voice applications, and vice-versa, by appropriate patching in the IDF or MDF}*
 - 1. Admin & Faculty Spaces and Offices – Two drops each on opposing walls {Note power needs to be provided on all three opposing walls to facilitate connection for PC's within six feet of each outlet}
 - 2. Gym-scorers table and in each of two corners
 - 3. Auditorium-Stage Wings each side
 - 4. Boiler Room/Mechanical Room-ATC Panel-two drops
 - 5. Security Panel (Main)
 - 6. School Police Office
 - 7. Cafeteria Kitchen & Office- two drops minimum (one for each POS terminal)-note run POS drop typically between the cash register(s) and the Kitchen Office to the POS server
 - 8. Building Engineers Office
 - 9. Each Classroom Two Drops for Wireless Data Access Point (AP) above ceiling, terminated. Other areas for Wireless AP drops that require coverage:
 - a. Gym
 - b. Cafeteria
 - c. IMC
 - d. Lobby
 - 10. Provide data drops at A/V HI-LO locations as shown in the modules
 - 11. Provide two data drops in each A/V RCP in each classroom

12. Provide one data drop to biometric time clock locations- one in the main office near the counter and one in the entrance that the custodian will enter
 13. Provide data drops for entrance area security scan stations/security check points-provide four drops total each entrance area (two drops on opposing walls) near where students enter the facility
 14. Provide one drop to each CCTV camera -if required per final design of that system
 15. Others per building specifics per scope or other SDP per project requirements
- B. Voice drops (all Cat. 6 minimum):
1. One per classroom, wall-mount in recessed phone wall box, see module detail PSD-1.8, typically located near the door
 2. Admin & Faculty Spaces and Offices-one drop each on opposing walls plus any dedicated fax locations
 3. Gym-scorers table and in each of two corners
 4. Auditorium-Stage Wings each side
 5. Gas Meter
 6. Boiler Room/Mechanical Room-for ATC/BAS systems, near the panel(s)
 7. Security Panel (Main)
 8. Fire Alarm Panel (Main) –two drops
 9. School Police Office
 10. Elevator Room-two drops
 11. Cafeteria Kitchen & Office
 12. Lobby Payphones (if any)
 13. Public Address System- main cabinet (two drops)
 14. Each IDF and MDF and Server Room
 15. Others per Building specifics per scope or other SDP per project requirements
- C. CATV drops:
1. One set per classroom and labs, at TV-Low/TV-High and AV-Low/AV-High locations as shown on the “module” drawings.
 2. Gym- select locations for origination if required
 3. Auditorium- Stage Wings and Front of Stage
 4. School Police Office
 5. Principals Office-one for receive and one for origination
 6. Admin and Faculty Offices-one each
 7. Conference Rooms & Teachers Lounge-one each

8. Entrance Locations-provide one at main entrance for future TV/kiosks
9. One drop to each CCTV Camera-as required
10. Others per Building specifics per scope and other SDP per project requirements

To provide clarification and consolidation of all drop types/counts reference the table attached to the end of this document “SDP GENERAL GUIDELINES FOR TELECOMMUNICATIONS DROPS/TYPES/LOCATIONS/COUNTS”. These Guidelines as attached in Appendix #2 shall be considered as general guidelines and shall be adhered to as practicable on each project; unless otherwise directed by the SDP Telecommunications and Networking Office.

PART 2 STRUCTURED CABLING SYSTEM (SCS) DISTRIBUTION

2.1 GENERAL

- A. Typical Modules for Space Layouts are:
 1. Classroom-1, 2, and 3
 2. Pod Classroom & Mini-Lab
 3. Band/Choir Room
 4. Tech-Ed Classroom
 5. Others
- B. Computer Labs
 1. Tech-Ed Lab
 2. Mini Lab
 3. Networking Academy Lab
 4. Computer Lab
 5. Others
- C. DATA SYSTEM HARDWARE/SOFTWARE
 1. Refer to Addendum #1 to this specification for Data/PBX/Wireless and A/V hardware/software within the building.

2.2 DEFINITIONS

- A. MAIN DISTRIBUTION FRAME (MDF): The MDF is the location, within a building or complex of buildings, where the entire telecommunications system originates. It may include: the physical location, enclosure, wire and cable management hardware, termination hardware, distribution hardware, and patching and equipment racks. EIA/TIA-569 refers to the room housing the MDF as the "Equipment Room." The MDF should consist of a fully enclosed room consisting of approximately 240 square feet and a minimum dimension of 12 feet by 20 feet inside. The walls shall be finished and painted. Ceiling clear space shall be 8'-6" AFF; no false ceiling is required but can be provided. Entry door shall be minimum 6'-

8" inside height and minimum 36" wide inside, no door sill. All walls shall be covered with 3/4" plywood, AC or better, from 12" above the finished floor to the ceiling, painted with two coats of fire retardant paint. The floor should be covered with VCT or sheet goods. Lighting shall be 50 FC and environmental conditions should be a dedicated cooling unit designed to cool the room between 64-75 degrees based upon the heat load generated. A minimum of eight quad-plex power outlets, each served by one 20 ampere, dedicated circuit should be provided from a dedicated and surge protected panelboard located in the room behind the door. The entry door should be lockable and controlled by a security card reader (note the card reader is an option and will need to be confirmed for each project). **The MDF shall be located on the 1st floor or above (must be above grade) and centrally located; situated within its building such that the cable route distance to the furthest workstation is less than 90 meters.**

1. Server Room shall be treated same as the MDF. Server Room shall also have humidity control. The number of circuits is as shown on the drawings.

Minimum Air Conditioning (AC) requirements for the MDF shall 2-4 tons; minimum for Server Rooms shall be 4-6 tons; all cooling units dedicated and on the building standby generator; units shall be designed for computer room applications and be provided with humidity control; all rooms on a 15-30 minute (at full load) UPS system backed up by the standby generator N/E circuits. UPS's shall be "Tripp-Lite", Smart Pro, with Ethernet SNMP management and "Tripp Lite" surge strip, No Substitutions Allowed.

- B. INTERMEDIATE DISTRIBUTION FRAME (IDF): The IDF is the location in a building where a transition between the backbone or vertical riser system and the individual drop distribution system occurs. It may include: the physical location, enclosure, wire and cable management hardware, termination hardware, distribution hardware, and patching and equipment racks. The IDF's provide the interface location between fiber distribution cable (backbone) and station cable (horizontal distribution). Each IDF should be a fully enclosed room consisting of approximately 100 square feet, with a minimum dimension of 10 feet by 10 feet inside. The walls shall be finished and painted. All walls shall be covered with 3/4" plywood, AC or better, from 12" above the finished floor to the ceiling, painted with two coats of fire retardant paint both sides. Ceiling clear space shall be 8'-6" AFF; no false ceiling is required but can be provided. Entry door shall be minimum 6'-8" inside height and minimum 36" wide inside, no door sill. The floor should be covered with VCT or sheet goods. Lighting shall be 50FC and the room should be air conditioned to maintain to maintain between 64-75 degrees based upon the heat load of the equipment. Provide at least four quad-plex power outlets, each served by one 20 ampere, dedicated circuit, each surge protected. The entry door shall be lockable and shall also have controlled access with a card reader (note card reader is an option and will need to be confirmed for each project). Care should be taken to situate each IDF in its building such that the station cable route distance to the furthest workstation is within 90 meters. **IDF's SHALL BE CENTRALLY LOCATED AND SHALL BE STACKED BETWEEN FLOORS; IDF'S SHALL ONLY SERVE DROPS ON THAT FLOOR; PROVIDE A MINIMUM 4-4" CONDUIT SLEEVES BETWEEN THE IDF'S.**

1. Minimum Air Conditioning (AC) requirements for an IDF shall 1-2 tons; all units dedicated for that room only ; all rooms on a 15-30 minute (full load) UPS system . UPS's shall be "Tripp-Lite", Smart Pro, with SNMP management and "Tripp Lite" surge strip, No Substitutions Allowed.

- C. **Entrance Facility (EF)**- The area is recommended to be dedicated space; however a space allocation of 8' x 8' is required, with at least three walls of plywood backboard the same as an IDF. Telecom grounding shall be provided. Note: if the EF service conduit is brought directly to the MDF in RGS or IMC threaded steel conduit then all services can be demarcated at the MDF, otherwise there must be an EF. {Note: if there is active equipment in an EF, i.e. carrier based equipment for delivering telcom services, then that room must be a air conditioned for that heat load}
- D. **BACKBONE PATHWAY**: The Backbone Pathway consists of a series of conduits, surface raceways (renovations only), cable trays, conduit sleeves, and chases which connect the MDF to IDF's and MDF to the EF and the MDF to the Server Room. It generally houses the vertical or backbone system.
- E. **BACKBOARD**: Backboard generally refers to the plywood sheeting lining the walls of telecommunications facilities. Backboard may also refer to the entire wall-mounted assembly, including wire management, wiring blocks, and equipment racks. In this case, the term Backboard is fully interchangeable with SBB or TTB and the equipment required to fulfill the Scope of Work below.

2.3 SYSTEM DESCRIPTION-GENERAL

- A. The data communications system shall consist of four components: active switch equipment, an optical fiber backbone, a copper twisted-pair backbone, and twisted pair copper work station cabling. In each permanent building the IDF's shall be connected to the MDF, via a single, 24/24 hybrid, optical fiber cable, installed in innerduct. Each optical fiber cable shall originate in the MDF and shall be terminated in its respective IDF(and Server Room in MS/HS's). All optical fiber cables shall be enclosed in innerduct which shall be routed through the school via cable tray and chases and/or a system of conduits and raceway. Any copper backbone cables shall be routed along with the fiber cable, shall originate at the MDF, and terminate in each of the IDF's. From each IDF one or more twisted-pair copper cables shall be routed to each data/voice outlet location via cable tray and conduit. These cables shall originate in an IDF and terminate in its respective data/voice outlet location. The MDF and each IDF shall house active data distribution equipment including but not limited to fiber switches, local area network switches, optical fiber transceivers, routers, and optical MAN gear devices, and other network based equipment. Telecommunications backbone grounding bare copper cable shall be routed in the cable tray system and backbone pathway system and be close-coupled to the backbone multi-pair copper voice cable.
 1. All Computer and Tech Labs shall be connected by 6/6 SM/MM hybrid fiber optic cable back to the nearest IDF. A data cabinet, wall mounted, shall be provided to house the fiber terminations and electronics and local cat. 6 data drops.

2.4 WORK DESCRIPTION -TYPICAL

- A. Contractor shall provide materials for and install a complete, functional telecommunications system in accordance with these guidelines and the typical drawing modules contained within this document. Contractor shall be responsible for providing a complete, functional system including all necessary components, whether included in this guideline document or not. **The Contractor is responsible for the entire installation project: including workmanship, standards of quality, adherence to these guidelines and the design documents, testing, final documentation, labeling, and final warranty and performance of the SCS.**
- B. The installation shall include cable (optical fiber and twisted-pair copper), innerduct, interconnect/patching equipment (fiber and copper), racks, cabinets, cable trays, cable runway, firestops, core bores, sleeves, supports (vertical and horizontal), cable management, connectors (fiber and copper), jumpers (optical fiber and twisted-pair copper), wiring blocks, and telecommunications outlets, and any other equipment. In addition to material and equipment, Contractor shall provide labor and any incidental material required for a quality, neat, and standards compliant installation. **All fiber strands shall be terminated with ST connectors and landed on the fiber patch panel interconnect equipment.** All copper station cables shall be terminated on patch panels (IDF end and in the MDF) and data/voice communications outlets (work station end). All exchange cables (copper backbone cables) shall be terminated on wiring blocks at each end as shown. All active equipment shall be installed and connected to the cable system, where approved by the . Upon completion of installation, Contractor shall test all fiber and copper cable channels and backbone and record the test results. Note that the Contractor must certify the SCS and provide the manufacturer's warranty on the SCS before the SDP will accept the installation, including all as-builts and all test reports for the fiber and copper plant. *{ Note all active equipment is typically provided by the SDP; such as the data network electronics, PBX, CATV headend, and installation by the SDP shall be coordinated with the Contractor }*
- C. The work performed under these guidelines shall be of good quality and performed in a workmanlike manner. In this context "good quality" means the work shall meet industry technical standards and quality of appearance. The owner reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds. "Rats Nest" wiring and poor workmanship is not acceptable.

2.5 MANUFACTURERS

- A. Contractor shall furnish and install all equipment, accessories, and materials necessary for a complete, functional copper (voice and data) and optical fiber data distribution system in accordance with these specifications.
- B. Throughout this specification, **SYSTIMAX (preferred but not required)** and other manufacturers are cited, along with specific part numbers. These citations are for the purpose of establishing quality and performance criteria. Subject to the provisions of these guideline specifications herein, Contractor may provide substitutions unless a product or manufacturer in a given section is cited as "no substitutions allowed." or "proprietary".

- C. Unless specified otherwise, in the following, the equipment furnished shall fall into six classes, and with exception of Class 6, all of the material within a single class shall be the standard product of one manufacturer. Exceptions are annotated [CLASS EXEMPT]. The six classes are as follows:
- D. Class One: Optical fiber cable, copper cable (both station and backbone), optical fiber jumpers, copper jumpers, blocking kits, interconnection devices, connectors (fiber and copper), wiring blocks, patch panels, and telecommunications outlets. All material covered in Class One shall be equal in quality and performance to that manufactured by SYSTIMAX . Note that other cabling systems meeting the listed performance and warranty requirements are also acceptable substitutions.
- E. Class Two: Fiber innerduct. All material covered in Class Two shall be equal in quality and performance to that manufactured by PYRAMID or CARLON or ENDOT.
- F. Class Three: Equipment racks and Cable Runways. All material covered in Class Three shall be equal in quality and performance to that manufactured by CPI or B-LINE.
- G. Class Four: Communications Cabinets and Wire Management Panels. All material covered in Class Four shall be manufactured by SYSTIMAX and CPI Megaframe (Server Cabinets).
- H. Class Five: Velcro wire ties/cable wraps, storage rings, labels, "D" rings(metal only), nuts, bolts, screws, and other miscellaneous and appurtenant hardware.
- I. Class Six: Systems Equipment/Hardware-PROPRIETARY
 - 1. PBX/Telephony: -AVAYA
 - 2. Data Network Equipment-NORTEL
 - 3. Wireless Data Access Points/Equipment- AVAYA (PROXIM)

2.6 FUNCTIONS AND OPERATION

- A. The intended function of the data communications cable system is to transmit data signals from a central location to several individual data outlet locations. Upon completion of the work outlined in this specification, the system shall be capable of transmitting data signals at a rate of 1000 Mbps minimum over Category 6 cable and over SM and MM fiber. Both SM and MM fiber shall also be capable of transmitting 10Gbps based upon the transmitting distance and number of links.
- B. The 50 μ micron multi-mode optical fiber cable system shall be capable of transmitting signals with a minimum modal bandwidth of 500 MHz-km at both 850 and 1300 nm (i.e. 500/500) This will allow nominal 600 meters @ 1GBPS and 82 meters @ 10GBPS. [An option can be provided to provide 2000 MHz-km 50 μ micron fiber using laser optimized fiber that will allow 300 meters @ 10GBPS using an 850nm VCSEL light source] The single-mode 8.3 μ micron (nominal) optical fiber cable system shall be capable of transmitting signals at both 1310 and 1550 nm. This will allow nominal 5km @ 1GBPS @1000 Base LX and nominal 10km @ 10GBPS @10GBASE-LX4.

- C. Work station cable, from the IDF to the work area, shall be installed in accordance with EIA/TIA-568-B.2 specified installation practices, BICSI Guidelines, manufacturer specified installation practices, SYSTIMAX or (Other Acceptable Substitutes) Certified Cabling System installation practices, and shall be capable of transmitting a signal at 1000 Mbps with acceptable attenuation and cross-talk measurements and PSACR MARGIN. The entire workstation cable system, including wiring blocks, cable, and telecommunications outlets shall be tested for Category Six compliance.

PART 3 PRODUCTS AND INSTALLATION

3.1 GENERAL

- A. Throughout Part 3, material quantities are not given. It is the responsibility of the Contractor to provide appropriate quantities of materials to provide a complete, functional system according to the design drawings, specifications, and work description.
- B. Equipment shall be installed in accordance with attached typical drawings ("Drawings"). General installation provisions are as follows:
 - 1. Equipment Racks: Equipment racks shall be assembled and mounted in locations shown in the Drawings and as described herein. Each rack shall be assembled in accordance with the manufacturer's instructions and recommendations. Each rack shall be mounted such that the side rails are plumb. Each rack shall be affixed to the building structure at each of the mounting holes provided. Attachment shall be by 1/2" X 1-1/4" lag bolts. A 3/8" pilot hole shall be drilled for each lag bolt. Each bolt shall be tightened to the extent that it holds the mounting hardware firmly, but not so tight as to distort the hardware or strip the threads. Equipment racks are to be co-located with the quad-plex power outlets (installed on the bottom of the racks with conduit connections) to allow for easy connection of racked equipment to the power system of the school.
 - 2. Wiring Blocks and Wire Management Components: Wiring blocks and wire management components shall be mounted to the plywood backboard. Wiring blocks and wire management shall be mounted in accordance with the attached drawings. Each device shall be mounted such that its horizontal dimension is level. In cases where more than one device is mounted, they shall be aligned vertically. Each device shall be affixed to the plywood backboard by means of screws suitable for fastening to plywood. A minimum of four (4) of the mounting holes provided shall be utilized for fastening. Screws shall be tightened to the extent that they hold the device snug to the backboard, but not so tight as to distort or damage the device. Wiring blocks shall be terminated in accordance with the manufacturer's instructions and recommendations. Installation of accessories shall also be conducted in accordance with the manufacturer's instructions and recommendations.
 - 3. Fiber and Copper Cable: Where fiber or copper cable enters an MDF or IDF it shall be supported on horizontal or vertical cable runway as shown on the typical drawings. If terminations are on backboards then from the runway support to the backboard via "D" Rings and cable ties. All cable shall be neatly bundled, combed, and tied. All cable runs, within the MDF or IDF, shall be horizontal or vertical, and bends shall comply with minimum specified cable bending radii. Copper UTP cable runs shall be provided with a ten foot slack loop in the cable runway, in each IDF. Spread out the Cat. 6 cable in the

runway and cable trays to avoid heavy stressing of the cable due to its own weight. Provide sufficient slack in the run to avoid any cinching of cables. **NOTE CAT.6 CABLES SHALL NOT BE CINCHED TOO TIGHTLY, CABLE TIES AT PATCH PANEL LOCATIONS SHALL BE VELCRO TYPE TIE-WRAPS ONLY. PLASTIC WIRE TIE WRAPS ARE NOT ALLOWED TO BE USED FOR ANY CAT.6 CABLING.**

4. Optical fiber Interconnect Equipment: Interconnect equipment shall generally be mounted on the equipment racks, as shown on the guideline details. When mounted on the backboard, the horizontal dimension shall be level. A minimum of four (4) of the mounting holes provided shall be utilized for fastening. Screws shall be tightened to the extent that they hold the device snug to the backboard, but not so tight as to distort or damage the device. Interconnect equipment mounted in racks shall be affixed to the rack by at least four (4) screws. The screws shall be of the correct size and thread configuration for the holes in the rack. They shall be tightened to the extent that they hold the equipment firmly to the rack, without distorting the equipment or stripping the threads. All optical fiber interconnect devices shall be assembled and installed in accordance with the manufacturer's instructions and recommendations. All large openings into wall mounted cabinets shall be covered by a grommet.
5. Labeling: hand written labels are not acceptable. All labels shall be machine printed on clear or opaque tape, stenciled onto adhesive labels, or type written onto adhesive labels. The font shall be at least one-eighth inch (1/8") in height, block characters, and legible. The text shall be of a color contrasting with the label such that it may be easily read. If labeling tape is utilized, the width of the tape shall not exceed 3/8," and the font color shall contrast with the background. Patch panels shall exhibit workstation numbers, in sequential order, for all workstations served by the MDF or IDF.
 - a. Each optical fiber cable segment shall be labeled at each end with its respective IDF identifier. Each fiber interconnect device shall be labeled with its respective IDF identifier. Each telecommunications outlet shall be labeled with its respective work station number (machine labels only). Workstation numbers shall be comprised of a sequential numbering scheme that meets the TIA/EIA-606 requirements, i.e. "1-1-DJ-52"(IDF #1-rack 1-data patch panel-port #52); or"1-2-VJ-48" (IDF #1-rack 2-voice patch panel-port# 48). Each workstation cable shall be labeled, using a machine based net permanent labeling medium, at each end with its respective workstation number. Each copper backbone cable shall be machine labeled at each end with its respective IDF number. Each binder group shall be tied off with its respective identifying ribbon at each break-out point.
6. Warning Tags: At each location where the fiber cable is exposed to human intrusion, it shall be marked with warning tags. These tags shall be yellow or orange in color, and shall contain the warning: "CAUTION FIBER OPTIC CABLE." The text shall be permanent, black, block characters, and at least 3/16" high. A warning tag shall be permanently affixed to each exposed cable or bundle of cables, at intervals of not more than five (5) feet. Any section of exposed cable which is less than five (5) feet in length shall have at least one warning tag affixed to it.

7. T-Bar Suspended Ceilings: Copper station cabling may be run outside of conduits and above T-Bar suspended ceilings only when between the cable tray and the conduit wall stub-up. All data drop/backbone cable above dropped ceilings shall be installed in J-hooks, cable tray, or a combination thereof, conduit, or in cable chase. **In no case shall cable be supported on ceiling tiles, t-bars, or tie-wrapped to any conduit or pipes. Cable must be supported in all areas. Bridle rings and tie-wrapped supporting means are not acceptable. Wire-rod cable trays are acceptable above dropped ceilings in-lieu of J-hooks. Laying cable on a T-bar ceiling is not allowed by the NEC and is not acceptable for support of Cat. 6 cabling, j-hooks must be used between conduit stub-ups and the wire rod cable tray for support.**

3.2 FIBER INNERDUCT

- A. DESCRIPTION: From the MDF to each IDF, segments of optical fiber innerduct shall be installed, surface supported, in chases, and in dropped ceilings (if applicable) in the existing building.
 1. Product: Carlon, or Pyramid, or Endot, riser rated, pre-lubricated, ribbed, 1-1/4" Optical fiber Innerduct with all necessary accessories. (Use plenum rated inner-duct only where required).
 2. Quantities Required: Innerduct runs do not have to be continuous throughout, breaks are expected at the pull boxes/pulling points. Contractor is responsible for determination of actual lengths of innerduct required. Enough innerduct shall be provided and installed to extend from the fiber service loop in the MDF to the fiber service loop in each IDF. If the route passes through a pull box, the segments of innerduct shall extend twelve inches into the pull box. If the route passes through an enroute IDF, each segment of innerduct shall extend at least twelve inches beyond the end of the service conduit. Couplings shall be installed to keep innerduct as continuous as possible for each run. Do not exceed manufacturers bend radius of the innerduct.
- B. INSTALLATION: Fiber innerduct shall be installed in accordance with manufacturers instructions and industry standards. Within the equipment rooms, the innerduct shall extend from the end of conduit to four (4) feet above the floor and shall be affixed to the backboard by means of clamps designed for that purpose. Care shall be taken to avoid kinking the innerduct or applying excessive tension during the installation process.

3.3 FIBER DISTRIBUTION

- A. DESCRIPTION: From the MDF to each IDF(and from MDF to Server Room and the MDF to the EF) a continuous segment of fiber cable shall be installed. Routing shall be via existing chases, cable tray, conduit, sleeves, and/or concealed above dropped ceilings (if applicable) . Through each conduit section, the optical fiber cable shall be housed in a minimum 1-1/4" innerduct, care being taken not to exceed NEC specifications regarding conduit fill. The cable shall be a 24/24 (48 strands) fiber, hybrid type cable, suitable for installation in innerduct, and be rated for risers. [Outside plant cable shall not extend more than fifty (50) feet into a building interior unless enclosed in RGS or IMC steel conduit.]

- B. Product: 24/24 (48 strands), hybrid cable, Premises Distribution (inside), 900 micron, type OFNP (OFNR if returns are ducted), tight buffered, UV resistant outer jacket, all dielectric, 24 multi-mode 50/125uM, 24 single-mode 8.3/125uM, 48 fibers total. Multi-mode maximum optical transmission loss shall be: 3.0 dB/km at 850 nm and 1.0 dB/km at 1300 nm; minimum bandwidth shall be 500 MHz-km at 850 nm and 500 MHz-km at 1300 nm. Single-mode maximum optical transmission loss 1.0 dB/km at both 1310 and 1550 nm. Multi-mode fiber shall conform to: TIA/EIA 568-B; EIA/TIA - 492 AAAB; and ANSI/ICEA S-83-596. Single mode fiber shall conform to TIA/EIA - 568 B; EIA/TIA - 492BAAA; and ANSI/ICEA S - 83 - 596. (Use plenum rated cable only where required).
1. Products: SYSTIMAX LazrSPEED 150/SYSTIMAX OPTISPEED SM Fiber or; equivalent Corning Cable Systems ; or others that meet the guidelines specifications.
 2. Quantities Required: The contractor is responsible for determination of actual segment lengths. Actual quantities will be determined by the routing as shown on the drawings and in the field.
 3. Required Accessories and Quantities:
 - a. Kit of Parts: Sufficient quantities to block and buffer both ends of each cable segment.
 - b. Sealant: Sealant sufficient quantities to block each end of each cable segment (outside plant cable only).
 - c. Provide Fan-Out kit for termination of the indoor fiber to the ST connectors.
 - d. Adapters: Multimode and Single-mode ST Fiber Optic Adaptors. {Two (2) simplex ST adaptors for each end of each fiber pair}. Shall meet 568B requirements. Color beige (or light gray) for multi-mode and blue for single-mode.
- C. FIBER OPTIC CABLE TERMINATIONS
1. Optical Fiber connectors
 - a. Products: SYSTIMAX STII connectors or approved equal (for Multi-Mode).
 - b. Products: SYSTIMAX STII connectors or approved equal (for single-mode).
- D. INSTALLATION: Installation shall be conducted following guidelines established by the product manufacturer and industry standards.
1. Fiber Optic Cable: During installation of the optical fiber cable segments into the conduit system, special care shall be taken to avoid damage to the cable. While under pulling tension, the cable shall not be bent into a curve with a radius of less than twenty (20) times the cable diameter, or no less than manufacturers minimum. Pulling tension shall not exceed manufacturer's recommended maximum tensile load. Contractor shall utilize a winch with tension control or a "break-away" link designed to break away at or below the recommended maximum tension.

2. The optical fiber cable shall be routed through the existing chases/pathways and onto the appropriate IDF backboard. Routing on the backboard shall be straight and plumb. A minimum thirty (30) foot service loop shall be provided at each backboard terminal location. From the service loop the fiber shall be terminated onto the rack mounted fiber optic patch panel (FOPP). Service loop shall be supported by a Re-Closeable Storage Ring on the backboard. Ring shall be Leviton # 48900-1FR or similar manufacturer.

E. FIBER TERMINATIONS:

1. Terminate all fibers.
2. Fiber Optic Housing Unit: SYSTIMAX LST1U-072/7 for all 24/24 backbone cables, or Corning Cable equivalent. All ST connectors.
3. Fiber Optic Housing Unit :SYSTIMAX 6001A Shelf with 12 ST connectors and 1U-19 trough for 6/6 cables in Labs or Corning Cable equivalent.
4. Surface Mount Fiber Wall mounted termination unit: SYSTIMAX Multi-Media 40A1 surface mounted outlet or M14 Multimedia Outlet, with six 12 ST connectors for 6/6 cables for the Teachers Lounge and Principals Conference Room.

3.4 WORK STATION CABLE

- A. DESCRIPTION: From each IDF, 4-pair Category 6 UTP cables shall be routed to each work station (for both data and voice outlets) served by the IDF. In cases where the data outlet resides in a classroom, a minimum of 12 cables plus one voice drop shall be required. In cases where the data outlet resides in office or administrative space, two cables plus one voice drop will be required. Additionally, cables shall be routed from the MDF to each work station located in its building in accordance with the preceding two sentences. Route drops in cable trays, conduit, j-hooks, and /or chases and sleeves as required.

B. COPPER UTP CABLE SPECIFICATIONS

1. HIGH SPEED LAN COMMUNICATIONS PLENUM CABLE, ENHANCED MARGIN CATEGORY 6 ,HORIZONTAL UNSHIELDED TWISTED PAIR (UTP).

C. SCOPE

1. This section defines the requirements for commercially available high-performance Category 6 plenum-rated LAN communications cable. The cable design described herein exceeds minimum ANSI/TIA/EIA 568- B Category 6 and ISO/IEC 11801 Class D standards in critical transmission characteristics and provides additional specifications for conductor insulation. This specification provides more ACR margin (headroom) at transmission frequencies up to 200 MHz, better electrical balance, and temperature/humidity stability for superior long-term performance. (NOTE: Minimum cable fire-rating shall be CMR; plenum rating only as required if returns are ducted; however, 100% FEP cable must be supplied).
 - a. The minimum PowerSum ACR, for the Worst Case Pair for a 4-Connector Channel shall be 10.9dB at 200 MHz.

2. ENGINEERING SPECIFICATIONS

a. Cable Manufacturers' Part Numbers:

- 1) SYSTIMAX # 2071E GigaMax Cable & Gigamax Cabling System-Preferred
- 2) Mohawk/CDT: AdvanceNet with Hubbell NEXTSPEED
- 3) Berk-Tek: LanMark 2000 with Ortronics Clarity
- 4) Superior Essex: NextGain with Leviton eXtreme
- 5) Commscope : Ultrapipe with Siemon Ultra-“Uniprise Solution”

b. Product: Jack Faceplates (WAO's) 4 pair, S110 connecting blocks, T568B pinning, Category 6 compliant, light Ivory or as selected by SDP:

- 1) Modular Outlet Jacks & Faceplates : [SYSTIMAX MGS-400 Series jacks in M-Series Information Outlets], 8 wire, T568B pinning, Category 6 S110 type insulation displacement modular outlet. Provide couplers as required per application and drawings.

c. Accessories: Snap-in colored icons, blue for data and light gray for voice, 'phone' for voice and 'computer' for data/video, labels and clear label covers, quantities as required

- 1) Required Accessories and Quantities (Surface Mount Boxes):
- 2) Modular Mounting Frames: [SYSTIMAX , PART #M12AP-246], Two-port, with cover, base, bezel, icons, screws, Light Ivory – surface mount with screws.
- 3) Modular Mounting Frames: [SYSTIMAX , PART #M14L-246], Four-port, with cover, base, bezel, icons, screws, Light Ivory – surface mount with screws.
- 4) Modular Mounting Frames: [SYSTIMAX , PART #M16L-246], Six-port, with cover, base, bezel, icons, screws, Light Ivory – surface mount with screws.
- 5) Modular Outlet Jacks : [SYSTIMAX M-Series Information Outlets or Flexible Information Outlets for HI-LO outlets and/or A/V outlets], 8 wire, T568B pinning, Category 6 S110 insulation displacement type modular outlet. Provide couplers as per application and drawings.
 - a) SYSTIMAX MGS400 Category 6 jack
 - b) single port F-type coaxial adapter
 - c) blank inserts for unused port
 - d) Icons same as surface raceway jacks

3. INSTALLATION:

- a. Installation shall be conducted in accordance with guidelines established the manufacturer and industry standards. Surface raceway jack faceplates shall be mounted in the surface raceway hanging boxes and shall be coordinated by the installation contractor. Each jack faceplate plate shall be labeled with its respective work station number. Each modular surface mounted box shall be labeled with its respective work station number. Labels shall be made by machine and shall be compliant with TIA/EIA-606 requirements.

3.5 MAIN DISTRIBUTION FACILITY (MDF)

A. DESCRIPTION: Each building shall contain one MDF. The MDF shall consist of a plywood backboard, equipment racks, fiber interconnection equipment, racks, patch panels, cable supports, wiring blocks for the interface of twisted-pair station cabling, and other miscellaneous equipment as required. The equipment shall be installed in accordance with Drawings and these specifications.

1. Products and Quantities:

a. Equipment Racks:

- 1) IDF: [CPI SINGLE POST FRAME, PART # 463-5-3-703], - 19" X 84," floor-mount with [CPI, PART # 11252-112/118, or B-Line equivalent] 12-inch or 18 inch cable runway ladder - Supply and install with accessories, as shown on the drawings. Cable Runway Radius Dropouts as shown on drawings over equipment [CPI, PART # 12100-212/218]. NOTE: ALL RACKS SHALL BE FLOOR MOUNT UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
- 2) MDF: [CPI QUADRA RACK FOUR POST FRAME, PART # 50120-703], - 19" X 84"H X 29"D, floor-mount with [CPI, PART # 11252-112/118, or B-Line equivalent] 12-inch or 18 inch cable runway ladder - Supply and install with accessories, as shown on the drawings. Cable Runway Radius Dropouts as shown on drawings over equipment [CPI, PART # 12100-212/218]. NOTE: ALL RACKS SHALL BE FLOOR MOUNT UNLESS INDICATED OTHERWISE ON THE DRAWINGS.

b. Fiber Optic Patch Panels (FOPP's): [SYSTIMAX PART # LST1U-072/7], - 72 port, rack mount fiber patch panel- {One (1) is required for each hybrid SM/MM fiber optic cable containing up to forty -eight (48) fiber strands entering an IDF or MDF.}

c. Modular Patch Panels: [SYSTIMAX PATCHMAX GS] - 48-port T568B wired Enhanced Category 6 Patch Panel. One (1) Port for each workstation served from the MDF with a minimum of 12 spare ports are required. If the number of workstation cables, plus required spare count (12) is greater than 48, then a second 48 port patch panel is required. Supply and install as many patch panels in the IDF's and in the MDF as necessary to service all workstation cables plus the required spare count. Install adhesive backed designation strip labels for administrative labeling,[SYSTIMAX PART #AVL-PM-BW-LT , # of 8 strip packages as required]

d. Patch Cables, Category 6, high performance: [SYSTIMAX PART # GS8E-YY-XX] where XX is the length in feet and YY is the color. Lengths shall be three (03), five (05), seven (07), or ten (10) feet; and cord colors shall be grey(03) for all except; yellow (09) for wireless drops, and red(07) for crossover cables. Colors as identified by the District shall be provided for VoIP and Security. {Two (2) patch cables are required for each patch panel port; one seven foot long in the closet and one ten foot long at the workstation PC end}. Shall be 568-B approved. Supply a minimum 7 foot and ten foot lengths and cord colors as directed by the District. Provide ten spare patch cords per closet.

- 1) Voice- 110 to 8-pin modular jack patch cords, SYSTIMAX Part # CPC8372-08F005. Provide qty one for each terminated voice patch panel outlet jack plus five spare per closet.
 - a) Provide qty five per closet (data to voice patch cords) SYSTIMAX Part # CPC 8372-02F025.
 - 2) ALL CAT. 6 PATCH CORDS MUST BE PROVIDED BY THE SAME MANUFACTURER AS THE SCS CABLES AND TERMINATIONS.
 - e. Switch Equipment and Associated Cables: As enumerated in Addendum #1. [CLASS EXEMPT]
 - f. Wiring Blocks(voice): [SYSTIMAX PART #110AW2-100] 100-pair wiring block, 110 field termination kit, {number of wiring blocks as required to terminate all 4-pair station cables plus 25% spare capacity} Note: station field blocks and riser field blocks shall be provided in the IDF's and in the MDF, with cross-connect wire in quantity to cross-connect all station pairs. Provide SYSTIMAX 110RD 19-inch bracket for mounting 110 blocks to 19-inch rack. [SYSTIMAX PART #110RD2-200-19].
2. Required Accessories and Quantities:
- a. Fiber Optic Coupling Panels: [for the LST1U- panel] – 24 2-port simplex ST Coupler Bezels, colors as selected by the District - {Eight (8) packages of 6-port ST coupler bezels are required for each FOPP installed.
 - b. Fiber Jumpers: [SYSTIMAX , PART #FZ2SC-STII+-10] 9.8 ft. (3.0 m) - Duplex, 50.0 micron, ST-SC Fiber Jumper. {One Fiber Jumper is required for each two strands of multimode fiber originating in the MDF, at both the MDF and IDF locations}. [At the discretion of the District provide ST-LC fiber jumpers]
 - c. Wire Management: [SYSTIMAX , PART #1100D3-35-19] 3.5" Front cord manager; Rear Cord Manager[velcro tie cable managers; CPI PART #02006-201, 4"or 6" cable bundle as required)]; {One Rear Cord Management Panel for each patch panel; One front cord manager panel between each set of patch panels; number of velcro hook an loop tie-wraps as required for neat and tidy rear cable management}. Vertical Cable Manager (6"Wx14.94"Dx7'H for 19-inch Equipment Racks; CPI PART #40098-703.
 - d. "D" Rings: Provide and install sufficient quantities of 3" or 6" "D" rings as required, and to conform to attached Drawings, or addendum.

B. INSTALLATION:

1. Installation shall be conducted in accordance with manufacturer's recommendations, industry standards, and this specification. Installation includes complete assembly and mounting of the fiber interconnect equipment, dressing the fiber and copper cables, complete assembly and mounting of the equipment rack, and mounting of the wiring blocks. Equipment shall be mounted in accordance with attached Drawings, and standard good installation practices.

3.6 INTERMEDIATE DISTRIBUTION FACILITIES

A. DESCRIPTION: Each building shall have at least one IDF per floor. In situations where the cable route distance to the furthest workstation in the building is greater than 90 meters, additional IDF's shall be provided in the design. Each IDF shall consist of a plywood backboard, equipment racks, fiber interconnect equipment, patch panels, cable runway supports, wire management, wiring blocks, and other miscellaneous equipment. See modules for details.

1. Products and Quantities: SAME AS THE MDF DESCRIPTION ABOVE

B. INSTALLATION:

1. Installation shall be conducted in accordance with manufacturer's recommendations, industry standards, and this specification. Installation includes complete assembly and mounting of the fiber interconnect equipment, dressing the fiber and copper cables, complete assembly and mounting of the equipment rack, and mounting of the wiring blocks. Equipment shall be mounted in accordance with Drawings, and standard good installation practices.

C. TESTING AND DOCUMENTATION

1. TESTING:

- a. Contractor shall test each fiber strand and each pair of each twisted-pair copper cable. The Owner reserves the right to have a representative present during all or a portion of the testing process. If the Owner elects to be present during testing, test results will only be acceptable when conducted in the presence of the Owner.
- b. Optical fiber Cable: Each fiber strand shall undergo bi-directional testing for signal attenuation losses.
 - 1) Test Equipment:
 - a) Multimode: Light Source and Power Meter .
 - b) Singlemode: Light Source and Power Meter .
 - c) OTDR
- c. Tests
 - 1) Multi-mode: Signal attenuation at 850 and 1300 nm.
 - 2) Single-mode: Bi-directional signal attenuation at 1310 and 1550 nm.
 - 3) Test all Fiber cable on the reel before installation, with an optical light meter, to ensure fiber continuity and no factory defects.
 - 4) Test Criteria: Signal loss of less than (3.6 dB for 1000 Base-SX @ 850NM for 50 uM fiber) through entire passive fiber path, including cable, couplers and jumpers.

D. FIBER OPTIC TESTING SPECIFICATIONS

1. All testing shall be performed by trained personnel.
2. For all installed fiber optic cable EIA 455-171 Method D procedures will be adhered to (Bi-directional).

3. Connector loss shall not exceed 0.75 dB per connector pair.
4. The Fiber Optic Cable shall not exceed 1.0 dB kilometer tested at 1310nm and 1550nm for single mode cable.
5. The Fiber Optic Cable shall not exceed 3.5dB per kilometer tested at 850 nm and 1.5dB per kilometer tested at 1300nm for multi-mode 50/125 fiber.
6. The contractor is responsible for obtaining minimum loss in fiber connections and polishing per manufacturer's specifications.
 - a. Pre-installation tests of Inter-plant fiber- pre-test each reel:
 - 1) Test each reel of fiber each strand for continuity with a light source. If continuity is not achieved:
 - a) Then test with an OTDR to determine the nature and location of the defect: Measure end-to end attenuation and the distance to a high attenuation point.
 - b) If Contractor determines fiber is defective he shall contact the manufacturer and provide a completely new fiber reel.
 - b. Tests for installed Inter-plant and Intra-plant fiber optic cable:
 - 1) Intra-plant and Inter-plant Multi-mode: Bi-directional signal attenuation at 850 and 1300 nm. power meter.
 - 2) Intra-plant and Inter-plant Single-mode: Bi-directional signal attenuation at 1310 and 1550 nm. power meter.
 - 3) Inter-plant Multi-mode: Bi-directional OTDR trace at 850 and 1300 nm. * OSP ONLY
 - 4) Interplant Single-mode: Bi-directional OTDR trace at 1310 and 1550 nm. * OSP ONLY

*Obtain the actual index of refraction (Δ) (IOR) from the cable Manufacturer before testing.

c. Test Criteria.

- 1) a. Total signal loss must not exceed the maximum Attenuation Coefficient plus the maximum Connector Attenuation as listed in TIA/EIA 568-B. See below:
 - a) Maximum Link Attenuation shall be as calculated below:
 - (1) Link attenuation is calculated as:
 - (2) Link Attenuation = Cable Attn + Connector Attn + Splice Attn
 - b) Cable Attn (db) = Attenuation coefficient (db/km) Length (Km)
- 2) Attenuation Coefficient
 - a) 3.5 dB/km @ 850 nm for 50/125 um
 - b) 1.5 dB/km @ 1300 nm for 50/125 um
 - c) 0.5 dB/km @ 1310 nm for single-mode outside plant cable
 - d) 0.5 dB/km @ 1550 nm for single-mode outside plant cable
 - e) 1.0 dB/km @ 1310 nm for single-mode inside plant cable

- f) 1.0 dB/km @ 1550 nm for single-mode inside plant cable
- 3) Connector Attn (db) = number of connector pairs connector loss (dB)
 - a) =2 x 0.75 dB
 - b) =1.5 dB
- 4) Splice Attn (dB) = number of splices (S) splice loss (dB)
 - a) =S 0.3 dB
- 5) "Measured" Link Attenuation shall be compared to "Calculated" Link Attenuation to determine acceptance. Any Links that fail shall be corrected by the Contractor at no additional cost.
- 6) Single-mode backbone links shall be tested at 1310 nm and 1550 nm in accordance with ANSI/TIA/EIA-526-7, Method A.1, One Reference Jumper. 62.5/125 um backbone links shall be tested at 850 nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A, Method A.1, One Reference Jumper.
- 7) Submit all test reports for approval; an OTDR signature report for every OSP cable by strand and a fiber optic link attenuation record report for every cable by strand.

E. WORKSTATION CABLE:

- 1. Each workstation cable shall be tested from the Jack Panel to the data outlet per TIA/EIA-568-B2.1 permanent link test requirements.
 - a. Test Equipment: Minimum Level III Compliant Tester
 - 1) [Wirescope 350(Agilent Technologies) or equivalent]
 - a) Test Criteria: The system shall be tested to Category 6 TIA/EIA-568-B.2-1 permanent link test parameter requirements.

F. DOCUMENTATION:

- 1. Contractor shall provide documentation to include test results and as-built drawings, all test results shall be computer generated. One Hard Copy shall also be provided to the District. Software for viewing the test results shall also be provided in the soft copy package.

G. FIBER TEST RESULTS:

- 1. The results of the fiber testing shall be entered into an approved form labeled" Fiber Attenuation Test Results." Hand written results are acceptable provided the text is neat and legible. Copies of test results are not acceptable. Only original signed copies will be acceptable. Use form from BICSI

H. WORK STATION CABLE:

- 1. The results of the work station cable tests shall be provided in the form of computer print-outs from the test equipment.

I. AS-BUILT DRAWINGS:

1. Contractor will be provided with clean copies of the Electrical drawings depicting data outlet locations or, if required by Addendum, shall produce drawings depicting data outlet locations as they were installed. The drawings, provided by Owner or in accordance with Addendum shall be modified to indicate actual cable routing, work station locations and workstation numbers.

3.7 INSTALLATION TESTING -COPPER

- A. The Owner/Engineer shall be notified 2 weeks prior to any testing so that the testing may be witnessed.
- B. Before requesting a final inspection, the Contractor shall perform a series of end to end installation performance tests. The Contractor shall submit for approval a proposal describing the test procedures, test result forms, and timetable for fiber optic and all copper plant wiring.
- C. Acceptance of the simple test procedures discussed below is predicated on the Contractor's use of the recommended products including but not limited to twisted pair cable, cross-connect blocks, and outlet devices specified and adherence to the inspection requirements and practices set forth. Acceptance of the completed installation will be evaluated in the context of each of these factors.
- D. Minimum Test Parameter requirements for Category 3 backbone and Enhanced Category 6 horizontal cabling.
 1. Category 3:
 - a. Each wire/pair shall be tested at both ends for the following utilizing Contractor generated test results forms:
 - 1) Termination order
 - 2) Polarity
 - 3) Continuity
 - 4) Shorts
 - 5) Grounds
 - 6) Cable length record all length
 2. Category 6:
 - a. Each wire/pair shall be tested at both ends for the following utilizing Contractor generated test results forms:
 - 1) Wire Map
 - 2) Length
 - 3) Insertion Loss
 - 4) Near-end crosstalk (NEXT) loss
 - 5) Power sum near-end crosstalk (PSNEXT)
 - 6) Equal-level far-end crosstalk (ELFEXT)
 - 7) Power sum equal-level far-end crosstalk (PSELFEXT)
 - 8) Return loss

- 9) Propagation delay
 - 10) Delay Skew
 - 11) Power Sum ACR
3. When errors are found, the source of each error shall be determined, corrected, and the cable re-tested. All defective components shall be replaced and retested. Defective components not corrected shall be reported to the Owner/Engineer with explanations of the corrective actions attempted.
 4. Test records shall be maintained using the approved test results forms. The form shall record closet number, riser pair number or outlet ID, outcome of test, indication of errors found (e.g., a, b, c, d, or e) cable length, re-test results after problem resolution and signature of the technician completing the tests.
 5. Test results for each 4 pair, Category 6, UTP cable must be submitted with identification to match labels on all patch panel ports and 8 position modular jacks, and identification to match as-builts associated with that cable.
 6. Owner/Engineer will observe and verify the accuracy of test results submitted.
 7. Submit in both hardcopy and electronic floppy disc format.

E. ACCEPTANCE

1. Acceptance of the Data Communications System, by Owner, shall be based on the results of testing, functionality, and the receipt of documentation. With regard to testing, all fiber segments and all workstation data cables must meet the criteria established in the Section above. With regard to functionality, Contractor must demonstrate to Owner that 1000 Mbps data signals can be successfully transmitted, bi-directionally, from the MDF to and from a minimum of 10% of individual data outlets on each floor, witness tested by the Owner.. The number of outlet locations to be tested shall be determined by Owner. With regard to documentation, all required documentation shall be submitted to Owner.

F. MINIMUM WARRANTY

1. The Cabling System shall meet the performance requirements of the ANSI/TIA/EIA-568-B.2 standard . The warranty on the material, services, and operation of the cabling system to this specification must be for a period of at least 20 years. The connecting hardware shall have a lifetime extended warranty against defects in material and workmanship.
2. The warranty must include the following statements regarding the cabling system:
 - a. "will support and conform to TIA/EIA-568-B specifications covering ANY CURRENT OR FUTURE APPLICATION which supports transmission over a properly constructed horizontal cabling system premises network which meets the channel and/or basic link performance as described in TIA/EIA-568-B ."
 - b. "will be free from defects in material or faulty workmanship."

3. GROUNDING AND BONDING

- a. All data communications cabinets and racks shall be grounded to power ground, with a minimum of #6 AWG copper. Telecommunications Ground Bars(TGB's) shall be installed in each cabinet and on every IDF/MDF backboard. Where as shown in the drawings to meet these guideline specifications a Telecommunications Grounding System shall be installed to meet the requirements of ANSI/TIA/EIA-607-A and the NEC, including Article 800. The Telecommunications Grounding System shall be installed to provide equalization of the grounding potentials between the power system and the telecommunications systems, to provide diversion of electrical transients from the telecommunications cables, to provide a safety ground for metallic racks/pathways, and to provide coupling to partially cancel transients.
- b. The minimum bonding shall be a #6 AWG bare copper tied to the TB/TGMB. The cabinet and rack and runway and tray and cabinets shall be solidly grounded to the TGB with a #6 AWG copper minimum, with the TGMB being solidly grounded to the power ground at the main switchboard ground bus. SEE STANDARD GROUNDING RISER.
 - 1) The TGB shall also be grounded (bonded) to the nearest power panelboard with a minimum #6 AWG or copper, if feasible.
 - 2) The TGB and TGMB shall be ¼" X 4" tin plated copper, minimum length 16"; busbar shall be predrilled provided with standard NEMA bolt hole sizing and spacing for the type of connectors to be used , 'ERICO' or approved equal. Mount on insulators to the plywood backboard, separation of 2" minimum.
 - 3) Connections shall be 2-hole NEMA type compression connectors or exothermic welded connections.
 - 4) Surge protection for incoming utility CATV or telephone services shall be grounded to the TGB in the EF.
 - 5) Surge protection for incoming telephone service shall lightning protection shall be grounded to the TGB in the EF (or in the MDF if service is routed directly to the MDF).
 - 6) All connections for bonding for protection terminals is minimum #6 AWG copper, solid. Also bond metallic sheath of any incoming service cables.

PART 4 VOICE DISTRIBUTION

4.1 GENERAL

A. PERFORMANCE REQUIREMENTS

1. The Telephone Voice Distribution System shall be provided from the outlet locations to the IDF's with Cat.6 station cabling; backbone multi-pair type cable shall be installed from the IDF's to the MDF; backbone multi-pair cable shall also be installed from the Entrance Facility room to the MDF in each building. Multi-Pair backbone cable routing shall be the same as the fiber backbone routing; also note that the main telecom grounding backbone cable shall take the same route; **all backbone cable shall be installed in cable tray.**

4.2 PRODUCTS AND INSTALLATION

- A. General: Refer to the requirements and equipment outlined in this guideline specification.
- B. Miscellaneous Hardware: Provide all terminations, cross-connects, wire management, surge protectors, etc. for a complete and operational system.
1. All backbone terminations shall be Type 110 type blocks(rack mounted) [SYSTIMAX Part #110AW2-100] Provide SYSTIMAX 110RD2 19-inch bracket for mounting 110 blocks to 19-inch equipment rack. [SYSTIMAX PART #110RD2-200-19].
 - a. All Horizontal voice drops shall be Cat.6 and shall be terminated on patch panels on the 19" racks.
 - b. All backbone Cat. 3 110 terminations in IDF's shall be located on the 19" racks and shall patch to the modular patch panels with 8 pin modular (568B pin-out) to 110 type patch cords, with one pair or two pair patch cord as required per phone type. [If space is at a premium in the MDF's wall mount the Cat. 3 110 backbone terminations and provide longer length 110 to 8 pin modular jack patch cords]
 - 1) In the MDF provide a sufficient number of 110 type terminations on the 19" racks to cross-connect to voice station drops and to connect to the 19" rack overhead to the PBX switch field with 25 pair cable/connectors.
 - c. All backbone Cat. 3 voice multi-pair cable in the MDF (from the IDF's and the EF) shall terminate on the wall to 110 blocks adjacent to the PBX switch field and connect with 25 pair connectors. See typical VOICE RISER DIAGRAMS.
 2. Surge Protection: Specific locations require new or replacement service entrance protection. Where indicated only, provide AT&T 189 Protector System, number of pairs as required, with 41CS protector units (or better) for every incoming pair, or approved equal. Provide in the EF, or in the MDF if cable is run all the way there through the EF. NOTE ADHERE TO THE NEC ART. 800 FIFTY FOOT RULE IF RUNNING UNBROKEN TO THE MDF.
 3. Horizontal Drop Station Voice Cable: 4 pair, #24 AWG, solid conductors, Category 6 Compliant minimum, jacket stamped with 'UL' or 'ETL' verified to Cat. 6," plenum rated type CMP, color shall be light gray. . (Note: Minimum cable rating is CMR, plenum rating only as required if returns are not ducted.)
 - a. SYSTIMAX 2071E for voice drops
 4. Backbone Voice Riser Cable: 100 pair or 300 pair as shown on drawings, plenum rated, type CMP, Cat. 3 compliant to EIA/TIA 568A requirements, #24 AWG solid copper conductors with PE insulation and PVC jacket. Provide AT&T ComCode #107766057 or approved equal. (Note: Minimum cable rating is CMR, plenum rating only as required only if returns are not ducted.)
 5. Jacks, wall mount only, EIA/TIA 568B Pin-out, Cat. 6; provide wall mount type jacks with studded mounts for locations as required – Classrooms shall be located in the recessed wall box enclosure-see module details

6. Auxiliary Equipment: The Contractor shall install cross-connect wire (minimum Cat. 3 rated), D- rings, wire distribution spools, 110 block labeling, organizer rings, and other appurtenances for a complete, neat, and functional system.

C. TESTING-CAT .3 Cable

1. The Contractor is responsible for testing and troubleshooting the cabling system to assure proper operation of the system. Testing shall include, but is not limited to the following: tone, continuity, grounds, shorts, opens, crosses, splits, and rolls. Correct all defects to provide satisfactory system operation. Provide a test report to the Owner that identifies all cable by its label designation.

D. RECORD DRAWINGS

1. The Contractor shall submit record drawings showing the actual system installation and the hardware/equipment locations. Clearly drafted markings on the Bid Documents attached Drawings shall be acceptable. These drawings shall indicate actual cable routing, cable numbers, outlet jack labeling, and designations of each termination at outlets and in the IDF's/MDF. Also included shall be the test report.

PART 5 VIDEO DISTRIBUTION

5.1 GENERAL

- A. The Video Distribution System shall consist of cabling and related cable system distribution devices required to support the Television Media Network for the facility. The work includes furnishing and installing a television distribution system complete and ready for use. The television system shall include all line amplifiers, modulators, power supplies, controls, cables, cabling, cable fittings, terminal outlets, wires, wiring devices, and all other parts, components, and equipment necessary to provide a system for the distribution of signals as herein specified. locations shall be as shown on the plans.
- B. Refer to Addendum #1 to this specification for Video Distribution Hardware/Software within building.
- C. All necessary equipment and installation materials, whether or not specified, shall be furnished in order to provide complete and satisfactory operating systems.
- D. The Contractor, IF requested by the SDP Office of Telecommunications and Networking, shall arrange for CATV service from local Cable TV company. Include any and all costs of arranging the services in the bid. Cable Company shall install service cable to CATV backboard and ground cable. Ground to the TGB in the EF with a min.#6AWG bare copper ground, and coordinate with the Cable Company. Contractor shall provide a Coaxial Lightning Surge Protector, low insertion dB loss, power handling 8x20μsec 20KA surge, to pass a minimum of 2GHZ signals, at the EF; Phoenix Contact, Citel, or approved equal.
 1. The Contractor shall furnish and install the coaxial cable from the CATV Service Board to Head-End Rack location (typically in or near the Library), size/type as required.
[Note that in new construction projects the CATV head –end shall be located in the MDF]

5.2 MAINTENANCE SERVICE WARRANTY

- A. Special Project Warranty: Submit a written warranty, executed by the contractor, installer, and the manufacturer, agreeing to repair or replace equipment which fails in material or workmanship within the specified warranty period. This warranty shall be in addition to and not a limitation of other rights the owner may have against the contractor under the contract documents. The written warranty must insure that the system down time will not exceed (4) hours in the event of a major equipment failure. The contractor will be required to provide service within four (4) hours of receipt of notice within the hours of 8:00 AM to 5:00 PM Monday through Friday.
- B. Warranty of Conformance with Specifications: The contractor shall warrant that all specified functions shall be provided even if functional omission is not discovered until the end of the warranty period. This shall warranty full function of the system even if the owner does not fully utilize the capabilities of the system initially.
- C. Warranty period is one (1) year after the Date of Final Completion.

5.3 TELEVISION NETWORK - GENERAL:

- A. The system shall receive cable television signals, amplify these signals by a minimum of one master amplifier, and distribute these signals to all TV outlets to permit the connection of standard cable ready television receivers (not specified under this document) commonly manufactured for the standard frequency bands. The system shall be designed with a minimum bandwidth of 5-1000MHz for all passive components.
- B. The system shall provide a minimum signal level of 0 dBmV at all channels, and a maximum of 5 dBmV positive or negative tilt, across 75 ohms, per channel of each TV outlet, across the design bandwidth.
- C. The system and all equipment shall be designed and rated for 24 hours per day continuous operation.
- D. The system noise figure shall not be more than 9 dB.
- E. The system shall use equipment matched to 75 ohms impedance with maximum voltage standing wave ratio VSWR of 1.4 so as to prevent ghosts or smear.
- F. The output levels of the SDP provided headend unit to be used for distribution design shall be + 46dbmv @ 750Mhz (channel 78) and + 37dbmv @ 54Mhz (channel 2) or equal to the local cable company specifications for second line extender in cascade. [only if supplied by the SDP, otherwise incoming head-end signal level shall be 5dB minimum from the street]
- G. Every classroom, library, auditorium, all purpose lounge, principal's office, gymnasium, lunch room and teachers lounge shall be provided with an outlet, at a minimum.
- H. System is to be constructed with one-piece hex crimp fittings.

- I. System shall meet or exceed nominal FCC end of line specifications in the furthest classroom and also shall meet FCC part 76 signal leakage specifications.

5.4 CABLE

- A. Each reel of coaxial cable used in the system shall be sweep tested for transmission and structural return loss and be so certified in writing by the cable manufacturer. Transmission sweep tests shall establish conformance to guaranteed loss values from 5-1000 MHz. Structural return loss tests by sweep method shall show a minimum return loss of 30 dB RL VHF, hard-line cable only.
- B. There shall be no splicing of coaxial cables between terminating points.
- C. All coaxial trunk cable between the main amplifier and the isolation tapoff units shall be RG11 size minimum, matrix foam polyethylene type, with quadfoil shield (unless otherwise noted). RG6 quadfoil shield minimum shall be used for room dropoffs. All cable shall be riser rated, plenum only if required. Toner .500 or .625 semi-flex hardline [Toner Series 6 drop cable, type T10; Toner Series 11 drop cable, type T10, all quadfoil shield: Toner .500 or .625 semiflex hardline.], or Commscope equal or other approved equal. All cable must be sweep tested to a minimum of 1 GHz.
- D. A/V Cable
 1. Audio Cable (for RCA Left and Right at teachers outlet), 2 each 1-Pair Number 22 AWG Shielded Twisted Pair, type CMP.
 2. Composite Video Cable: (1) RG-59 coaxial cable
 3. S-video cable: (1) 2-coaxial conductor High Resolution Cable, CMP, 26 AWG stranded, each with double-shielded foil. Provide Extron Mini HR Cable.
 4. Computer Video Cable: (1) 5-coaxial conductor High Resolution Cable, CMP, 26 AWG stranded, each with double-shielded foil, for computer video. Provide Extron Mini HR Cable.

5.5 CLASSROOM EQUIPMENT

- A. A/V Computer interface Receptacles: (for locations with RCP box)
 1. The teachers workstation outlet (AV-L) shall be equipped with a HD-15 computer video receptacle with local monitor output, mini din standard S-video jack and three RCA jacks on the same outlet plate as the network drop with wiring to RCP panel. The projector outlet (AV-H) shall be the same with wiring to RCP panel. See drawings.
- B. A/V Computer interface Receptacles: (for locations without RCP box)
 1. The teachers workstation outlet (AV-L) shall be equipped with a HD-15 computer video receptacle with local monitor output, mini din standard S-video jack, three RCA jacks, f-type connector, and cat.6 on the same outlet plate as the network drop with wiring to matching receptacles (minus f-connector) at the projector outlet (AV-H). See drawings.

C. Television/Video High-Low Outlets:

1. The High video outlet as designated on the plans shall be equipped with an S-video jack, three RCA jacks (two L/R audio and one composite video), and one CATV "F" type coupler; provide wiring to matching outlet at the Low video outlet location. CATV signal to the 'F' connectors will be split by an installed 2-way splitter as indicated on detail drawings. The high and low outlet locations shall be connected via: conduit (for new construction; surface raceway (for renovations).

D. Remote Control Panel:

1. The remote control panel shall contain all controls for switching of video sources at the ceiling mounted projector. See appendix for preferred manufacturers.

E. Television High and Low outlets:

1. The Outlets as designated on the plans shall contain an outlet plate with one CATV "F" type coupler.

5.6 DISTRIBUTION COMPONENTS

- A. The naming of manufacturers or items of material is not intended to be restrictive, but rather to establish criteria for design and quality. Equipment by others meeting these specifications shall be considered equal. Catalog and model numbers are intended to indicate type, quality of design, material, as well as exact operating features required. All Passives shall feature RF shielding for FCC compliance.

B. Furnish and install at least the following distribution components:

1. Toner Series XGHS Splitters for response to Min. 1 GHz, 120dB RFI shielding, or equal.
2. Toner Series Directional Coupler Taps, Type SMT10#-*{# 2,4,or 8-way taps} {* tap values of 4, 8, 11, 14, 17, 20, 23, 26, 29, 32 dB}, Min. 1 GHz, 120 dB RFI shielding, or equal.
3. Toner Series XGHS Drop Splitters, 2,3,4,6,8 way; Min. 1 GHz, 120dB RFI shielding, or equal.
4. F type Coaxial Outlets that will fit into the SYSTIMAX M Series modular jack faceplates, for Series 6(RG-6) coaxial cable.
5. Splitters, Multitaps, Couplers, and F outlets shall be furnished and installed "As Required" and as dictated by contract drawings and final system detail layout. Tap values for all directional couplers to be determined by installing contractor. All Multitaps are to be wall mounted in the telecommunications closets.
6. Miscellaneous Accessories:
 - a. Install any and all appurtenances as required for a complete and operational installation, including but not limited to: cable support materials, grounding materials, boots, jumper cables, F-connectors, etc.

5.7 HEADEND EQUIPMENT

- A. All central Video distribution electronic equipment listed in an Addendum to this specification for the Media/Television Distribution shall be rack mounted in one wall mounted equipment cabinet furnished by the District and located in the MDF. All equipment shall be protected by grounding to an approved electrical ground. All equipment shall be installed as to be accessible for maintenance and shall be located so as not to interfere with the servicing of other nearby equipment. Fill unused rack space with matching blank panels.
- B. Video Head-end Alternate design:
 - 1. Alternate head-end design is to be agile and capable of adding more originated material as deemed necessary by SDP. The system shall be a bi-directional system pre-configured with two (2) sub-channel origination channels. All equipment will be mounted in a floor standing enclosure and shall typically be located somewhere within the media resource center and/or library. Multiple source units shall be installed in the headend, including, but not limited to, DVD players, VHS cassette players, Laser Discs, Digital satellite cable receivers, etc. Rack shall include a UPS and other appurtenant equipment.
 - 2. See attached sketch for alternate head-end layout.

5.8 INSTALLATION

- A. Comply with installation instructions provided by system manufacturer.
- B. Install system to comply with drawings and final shop drawings in compliance with manufacturer's printed instructions.
- C. Cable identification: shall be provided on both ends of each cable and termination with the owners room number and the wiring block or device to which it is connected. Tags shall be permanent and neat.
- D. Install CATV cable to insure minimum allowable signal level at all outlets, across the design Bandwidth.
- E. Provide bushings on the cut end of all conduits to prevent cable damage.
- F. Cable runs are to be installed in a neat and clean fashion and shall not rest directly on ceiling tiles, lamp fixtures, etc. Cables and cable trunks shall be suspended from the slab above with their own separate supports and not be attached to those of the ceiling grid suspension system. For coaxial cable bridle rings and J-hooks are acceptable. Installation shall meet NEC requirements.
- G. Termination: The Contractor must perform all terminations at device and headend locations.

- H. Testing:
 - 1. Aligning and Balancing:
 - a. The Contractor shall align and balance the system by adjusting the gain or sensitivity of the system's amplifiers to match the specified signal levels and impedance within the system.
 - 2. Testing:
 - a. Test cable before installation for structural return loss (hard-line only), continuity, and dB loss. After system installation ensure the system and its components meet specifications for:
 - 1) End-of-Line readings
 - 2) Leakage Test
 - b. Contractor shall provide a testing that validates they meet FCC Part 76 for signal leakage, and provide a report to certify such to the Engineer.
 - c. Ensure the signal level at the outlets meets the requirements previously listed.

PART 6 MASTER PA / MASTER CLOCK SYSTEM

6.1 DESCRIPTION

- A. The School Districts standard PA system is a dial-access only zoned public address system. System shall be zoned by floor with additional zones for the exterior speakers, cafeteria, and Gymnasium. The system shall be expandable to 81 distinct paging zones, and shall also have an all call page bus allowing immediate access to the entire system. All Equipment shall be located in the MDF
- B. The School Districts Standard Master Clock system is a stand-alone unit with GPS satellite time synchronization capabilities. The system shall synchronize all secondary clocks via RF transmission. It shall also have the capability of synchronizing all computer clocks on the school network through the use of an external adaptor.
- C. Alternate Master Clock system: The master clock system shall be a standard low voltage wired master clock system with all secondary clocks being powered from the master clock control unit. GPS synchronization of the master clock will be available as an option.

6.2 MASTER PA EQUIPMENT

- A. The Master PA system shall be wall mounted in the MDF and shall be interfaced to the schools telephone system for dial access paging.
- B. The core equipment for the Master PA system shall be manufactured by Bogen, model PCM2000. This is a School District proprietary standard. Unit shall be configured for the number of zones as requested by the school district per project. See attached sketches for layout.

- C. Provide a minimum of one (1) amplifier capable of delivering a minimum of 250 watts over a 70v style distribution system. Unit to be wall mounted in the MDF.
- D. Speakers:
 - 1. All interior ceiling mounted speakers shall be 8" flush mounted 70V type speakers with an integrated multi-tap transformer, baffle with sound deadening materials, and ceiling tile bridge. All units to be tapped @ 1 watt.
 - a. Speakers shall be mounted 1 per classroom and office {note that if classrooms are >500 SF then consideration should be given to two speakers, provided the proper spacing can be maintained between the speakers and the walls}
 - b. Speakers shall be mounted 25 feet apart in all corridors
 - c. Speakers shall be mounted in a 20' x 20' grid in the cafeteria.
 - 2. All exterior paging horns shall be surface mounted double re-entrant weatherproof horn type loudspeakers with weather tight input adaptor. Units shall be 70v and tapped @ 15 watts.
 - a. Speakers shall be mounted as high as possible and located near entrance doors and playgrounds.
 - 3. All interior paging horns shall be surface mounted double re-entrant horn type loudspeakers with a multi-tap 70v transformer.
 - a. For horns located in gymnasiums, a wire guard is to be provided.
 - b. Horns shall be mounted at the ceiling, 2 for a small gymnasium and 4 for a large gymnasium.
 - c. All mechanical rooms shall be covered by paging horns.
 - d. Locker rooms shall be covered by paging horns, with a wire-guard.
 - 4. Where shown on plans, provide a wall mounted volume control with 10 distinct steps and capability to fully dissipate all power going to the speaker it is controlling.

6.3 MASTER CLOCK EQUIPMENT:

- A. The Clock system shall be a wireless system with all synchronization occurring over an RF modulated time pulse. The master clock unit shall be located in the MDF. The GPS receiver shall be located on the roof for the best possible signal reception. The bell tone generator shall be located with the master pa system equipment. A wireless data connection shall be provided from this unit to the main secretaries computer for programming and schedule changes.
- B. Secondary Clocks:
 - 1. Standard design (wireless):
 - a. All secondary clocks shall receive their synchronization signals via RF and shall be battery operated. Clocks shall be any of the following types, face styles shall be determined per project by the architect:
 - 1) 12 inch analog clocks for all locations except for gymnasium and auditorium.

- 2) 16 inch analog clocks for gymnasiums and auditoriums – with protective wire-gaurd for gymnasium units.
- 3) 4 inch digital clocks for all locations except gymnasium.
- 4) Clocks in locker rooms shall be provided with a protective wire-guard.
- b. Analog clocks to be used primarily in elementary schools. Digital to be used in middle to high schools.
- c. As necessary, provide repeater units to allow total synchronization coverage throughout the building.
- 2. Alternate design (wired):
 - a. All secondary clocks shall be powered from the master clock unit and shall receive their synchronization signal either over the power line, or over a separate cable run. Units shall be low voltage AC or DC. Clocks shall be any of the following types, face styles shall be determined per project by the architect.
 - 1) 12 inch analog clocks for all locations except for gymnasium and auditorium.
 - 2) 16 inch analog clocks for gymnasiums and auditoriums – with protective wiregaurd for gymnasium units.
 - 3) 4 inch digital clocks for all locations except gymnasium.
 - b. Analog clocks to be used primarily in elementary schools. Digital to be used in middle to high schools.

6.4 INSTALLATION

- A. Install system to comply with drawings and final shop drawings in compliance with manufacturer's printed instructions.
- B. Cable Identification:
 - 1. Shall be provided on both ends of each cable and termination with the Owner's room number and the wiring block or device to which it is connected. Tags shall be permanent and neat.
- C. Furnish and install necessary conduit, raceways, pull boxes, outlet boxes and wire to provide a complete system or systems as herein specified. All wiring shall be tested for continuity and freedom of all grounds and short circuits.
- D. Each cable run between the console and remote locations shall be one continuous cable. All cable shall be as manufactured by Comscope, Belden, or West Penn. Intercommunication system cable shall not share conduit with any other system.
 - 1. All cable shall be Plenum rated.
 - 2. Cable to paging horns shall be TSP, 18 AWG minimum, type CMP.

- E. The Contractor shall use the types of wire recommended by the Sound Equipment Manufacturer. However, the size and quality shall not be less than that previously specified or indicated on the drawings. If cross talk, appreciable loss of volume or distortion occurs after installation has been completed, it shall be the mutual responsibility of the Contractor and Manufacturer to correct any such condition without cost to the Owner. The Contractor in no case shall use the type of wire which he merely assumes to be the best. This recommendation shall be from the equipment manufacturer.
- F. All speaker or microphone cables shall be twisted shielded pair, low capacitance, size as required, 100% shield coverage, plenum rated.
- G. The number of speakers per home run cable shall not exceed manufacturers recommendations.
- H. Separation: Sound and voice cables shall be separated from power as follows: 6 inches from light fixtures, 12 inches from power conduits, and minimum 48 inches from motors/transformers.
- I. Conduits to the Roof: Provide two 4" conduits from the roof to the nearest IDF on the top floor, for the satellite receiver cable and for any other satellite equipment.

PART 7 REMOTE SOUND SYSTEMS

7.1 GENERAL:

- A. This section describes the audio/video requirements of typical rooms. These descriptions shall be used as standard guidelines during the design phase of each project. See attached sketches for room layouts. The intent of these specifications is to provide complete and satisfactory operating systems for the pickup, amplification and reproduction of voice and/or music.
- B. None of the following systems are to be interfaced with the building Master PA system. Each of these rooms shall include dedicated speakers/horns attached to the building public address system.

7.2 DESCRIPTIONS:

- A. Cafeteria:
 - 1. The cafeteria shall be provided with a locally controlled remote sound system including automatic mixer, cd/tape combo deck, wireless mic(s), Assistive listening system, feedback eliminator, amplifier, speakers, microphones outlets, power conditioning, remote volume control, and equipment rack.
 - a. Speakers shall be mounted in a 20' x 20' grid (where dropped ceiling is installed)
 - b. The remote volume control will be located either by the cash registers or the main doors to the room.
 - 2. Equipment rack to be installed typically in nearby storage room or cafeteria office

B. Auditorium:

1. Middle/Elementary School: The auditorium shall be provided with a locally controlled remote sound system including automatic mixer, cd/tape combo deck, wireless mics, Assistive listening system, feedback eliminator, choir microphones, amplifiers, speakers, microphone outlets, sequential power control, and equipment rack.
 - a. The equipment typically will be mounted backstage.
2. Highschool: The auditorium shall be provided with a locally controlled remote sound system including automatic mixer, manual mixer, digital signal processor, production intercom system, cd changer, dual cassette deck, recording microphones, wireless microphones, choir microphones, monitor speakers, amplifiers, speakers, Assistive listening system, equipment racks, and sequential power supplies.
 - a. The equipment typically will be located in an equipment booth located in the rear of the room (balcony or ground level) for easy production control. The room will be secure and shall have sliding glass windows. This room will also contain the controls for the stage lighting system.
 - b. This system could also include equipment for video playback, including, a DLP projector, DVD and VCR, and a computer video interface from somewhere at the stage area.
 - 1) The Projector shall either be installed in the auditorium ceiling from a scissor lift, or located in the control booth.

C. Gymnasium:

1. Middle/Elementary School: The gymnasium shall be provided with a locally controlled remote sound system including automatic mixer, cd/tape combo deck, wireless mics, Assistive listening system, feedback eliminator, amplifiers, speakers, remote volume control, microphone outlets, sequential power control, and equipment rack.
 - a. The equipment rack will typically be mounted in a nearby equipment storage room, or the gym teachers' office.
 - b. The remote volume control will be keyed to reduce tampering.
2. Highschool: The gymnasium shall be provided with a locally controlled remote sound system including manual mixer, cd/tape combo deck, digital signal processor, microphone outlets, wireless microphones, amplifiers, speakers, Assistive listening system, equipment rack, and sequential power supply.
 - a. The equipment rack will typically be mounted in a nearby equipment storage room, or the gym teachers' office.
 - b. Microphone outlets shall be provided in the floor beside the basketball court outline. These shall be used for the scorer's tables.

- D. Cafetorium/Gymatorium/Gymateria (multipurpose room): The multipurpose room shall be provided with a locally controlled remote sound system including automatic or manual mixer, cd/tape combo deck, wireless mics, Assistive listening system, feedback eliminator, amplifiers, speakers, remote volume control, microphone outlets, sequential power control, and equipment rack.

1. This room, due to its versatility, might also include: choir microphones, monitor speakers, and a digital signal processor in place of the feedback eliminator. This type of room will be handled differently for every project and will depend on the exact layout of the room.
 2. Due to the nature of these rooms, the speakers provided may be either ceiling mounted, where drop ceiling is installed, or wall mounted, where there is a stage. Speaker layout will be handled on a design by design basis.
- E. Large Group Instruction (LGI): The LGI shall be provided with a locally controlled remote audio/video system including video switch, automatic mixer, amplifier, speakers, feedback eliminator, dvd, vcr, remote control system, LCD/DLP ceiling mounted projector, remote video inputs, and equipment rack.
1. This room, due to its versatility, might also include: video conferencing system, document camera, smart podium, and remote controllable lighting. This type of room will be handled differently for every project and will depend on the exact layout of the room.
- F. Lab: The lab shall be provided with a locally controllable audio/video system including ceiling mounted LCD/DLP projector, teachers computer video interface, and remote control system.
- G. Conference Room: The typical conference room shall be outfitted with A/V cabling from the conference table to a location in the ceiling for future a future DLP projector. The outlets in the table shall be mounted in a tilt-up hideaway box – see addendum for preferred equipment manufacturer.
1. Data and Voice connections shall be provided in the conference room for a future portable video conferencing system.
- H. Library/Media Resource Center: The library shall be provided
1. Data and Voice connections shall be provided in the conference room for a future portable video conferencing system.
- I. Typical Classroom:
1. Basic: The typical classroom will be provided with speaker, clock, and TV H/L outlet.
 2. Basic Upgrade: Shall be the same as above with the addition of: AV H/L cabling for future ceiling mounted LCD/DLP projector. The Low outlet location shall be near the teachers desk, and the high outlet location shall be placed in the center of the room. An equipment cabinet shall be provided for future dvd/vcr/amplifer/switcher, this unit shall be flush mounted in the wall and will fold down for when the source units are in use – see addendum for preferred equipment manufacturer.
 3. Advanced: Shall be the same as above with the addition of amplified loud speakers mounted in the ceiling. A wall mounted Smart® board shall be an additional option to this layout.

- J. A+ “Certification” Networking Lab: This lab shall be provided with AV H/L projector cabling for the lecture area with a fixed instruction podium with all desired sources and a fixed ceiling mounted LCD/DLP projector. This room will additionally be provided with two or more clocks, three ceiling mounted speakers, and one TV high outlet. All data in this room shall be serviced from a local network equipment cabinet that will be attached via fiber optic cabling back to the nearest IDF/MDF closet.

7.3 PROJECTORS

- A. This section shall provide performance requirements for the various types of digital projectors.
 - 1. Large venue projector: For all large venues requiring a digital projector, the unit provided shall meet the following performance criteria:
 - a. Unit shall be a single or dual bulb projector.
 - b. Unit shall have a minimum light output of 4000 ANSI lumens.
 - c. Unit shall be capable of displaying XGA resolutions natively.
 - 2. Classroom and Lab projector: For all classrooms and labs to be provided with a digital projector, the unit shall meet the following performance criteria:
 - a. Unit shall have a minimum light output of 2000 ANSI lumens.
 - b. Unit shall be capable of ceiling mounting, i.e. internal digital image flipping.
 - c. Unit shall be capable of displaying SXGA resolutions natively.
 - 3. Portable projector: For all portable projectors to be provided, the unit shall meet the following performance criteria:
 - a. Unit shall have a minimum light output of 1700 ANSI lumens.
 - b. Unit shall have a zoom lens with autofocus.
 - c. Unit shall be capable of displaying XGA resolutions natively.
- B. An active networked monitoring device shall be provided for all projector units that are going to be permanently installed.

PART 8 CABLE AND WIRE MANAGEMENT

8.1 GENERAL

- A. Where cable can be run above accessible ceilings(or in crawl spaces/attics, and in basements as shown) all voice, data, and video cable shall be supported by Cat. 6 rated J-hooks, Cable Tray, conduit, or other District approved means. In no case shall CAT 6 cable ever be tie-wrapped unless such tie-wraps are velcro type(only for use in wire management in IDF’s/MDF’s) that will ensure that the cable is not too tightly cinched. All CAT. 6 cable shall be supported by J-hooks(CAT. 6 rated only) or other approved means(surface raceway, primarily cable tray in all corridors, conduit, wireway, wire trough) and shall never be supported by any tie-wraps to process pipes or structural steel. Bridle rings are not acceptable for CAT. 6 installation.

- B. Cabling, voice and data, shall be installed according to the general requirements, as detailed below, and as shown on the drawings or in an attached addendum.
1. No more than 50 UTP cable drops per run can be installed in Category 6 two inch "J-hooks" as called out herein (if necessary).
 2. Fiber Cable, installed in innerduct, shall be installed in cable tray and supported where required only in Category 6 "J-hooks," only 2-1" innerducts per 2" J-hook, or 4-1" per 4" J-hook.
 3. Station Cable drops from work area outlet will be installed in conduit, Category 6 "J-hooks," from outlet stub up to the cable tray.
 4. Exposed Innerduct in corridors (NOT IN TRAY ONLY) shall be run as high as possible and be supported by 2" J-hooks every 4 feet max. Innerduct shall be tie-wrapped to the J-hook for securing.
 5. Use Vertical Wire runway to support any /all risers between floors in closets or accessible locations; in no case shall any cable risers be unsupported.
 6. Cables entering IDF's/MDF's shall be supported with Cable runway as shown on the drawings, from entrance to rack/cabinet location. Cables
 7. Wire rod cable tray shall be provided in all corridors with minimum size 12" x 4" deep, with a minimum of at least 6" clear AFC and 12" clear above.

8.2 PRODUCTS AND INSTALLATION

- A. WIRE ROD TYPE CABLE TRAY-INSTALL IN ALL CORRIDORS AND FOR ALL MAIN RUNS OF BACKBONE CABLE AND TO SUPPORT DROPS
- B. Description:
1. Welded wire mesh cable management system.
- C. Material: Carbon Steel
- D. Finish: Electro-plated Zinc Galvanizing: ASTM B 633, Type III, SC-1
- E. Construction: Cable trays shall be constructed with high strength welded steel wire mess. Wire rod tray is to have a continuous safety edge wire lip. Wire rod tray sections shall be mechanically connected with ends finished to protect installers and cables.
- F. Inside Width: Products should be available in 6 inch, 8 inch, 12 inch and 24 inch widths.
- G. Inside Depth: Products should be available in 1- ½ inch, 2 inch and 4 inch depths.
1. Provide cable tray in 4 inch depths unless otherwise noted on the project drawings.
- H. Tray sections shall be supplied in nominal 10 foot lengths.
- I. Mesh Spacing: 4 inches x 2 inches.

- J. All tray section splices shall use connectors designed for that purpose from the same manufacturer. Connectors must protect cables from sharp edges to prevent damage.
- K. Provide manufacturer's standard clamps, hangers, brackets, splice plates, blind ends, barrier strips, connectors, grounding straps, and all other apparatus is required.
- L. Cable Tray – Wire-rod type:
 - 1. GS Metal Flex Tray series
 - 2. Triangle Electrical Products. Co.
 - 3. Cooper FB – Line Systems

8.3 TROUGH TYPE CABLE RUNWAY

- A. Description: 1 ½ inches Tubular Stringer/Style
- B. Material: Steel
- C. Minimum Loading: 95 pounds/feet with 5 feet support spacing
- D. Finish: Telecom Gray Powder Coat
- E. Construction: Cable Runway shall be constructed with 2 tube stringers 3/8 inch x 1 ½ inches x 1 inch rungs. Rungs shall be mechanically connected to square trunks with ends finished to protect installers and cables.
- F. Width: Cable runway shall be available in 6 inch, 12inch, 18 inch, and 24 inch widths. Provide widths as indicated on the project drawings.
- G. Inside Depth: Provide cable runway without sides unless otherwise indicated on the project drawings.
 - 1. If trough type cable runway is indicated, then provide fixed or removable side posts.
 - 2. Side posts shall be a minimum of 5 inches in height, and tall enough to provide support for the dressed cable bundles.[ONLY IF INDICATED ON DRAWINGS]
- H. Straight sections shall be supplied in nominal 10 inch lengths.
- I. Straight Rung Spacing: 9 inches
- J. Provide runway with rounded edges and smooth surfaces.
- K. End caps are to be uses at all butt ends of the runway.
- L. All splices shall use connectors designed for that purpose from the same manufacturer. Connectors must protect cables from sharp edges to prevent damage.

- M. Radial drop-out sections and corners are required on each runway section. Vertical drop-outs are used at each relay rack or telecommunications cabinet. Horizontal corners are radial to protect the cables from exceeding maximum bend radii.

Provide manufacturer's standard clamps, hangers, brackets, splice plates, reducer plates, blind ends, barrier or divider strips, connectors, grounding straps, and all other apparatus as required.

N. Runway Manufacturers:

1. B-Line (Saunders) – Type SB series
2. Chatsworth Products, Inc. – Type 11252 series
3. Newton Instrument Company – Type 2003 series

O. J-HOOKS:

1. J-hooks shall be the ERICO CADDY Fastener "Cable Cat J-Hook System" specifically designed for CAT. 6 and Fiber Optic Cables. Provide the 2" diameter hook, Cat. # "CAT 32" or 4" diameter hook, Cat.# "CAT 64" as required between the tray and conduit stub-ups, or in other areas as required; furnish and install hanger brackets/assemblies/hooks as required to support all voice/data/video cable (above accessible ceilings or as indicated on the drawings) at no greater than 48" with no greater than 12" sag between supports. Do not install more than 50 cables per 2" hook or 100 cables per 4" hook. Separation from light fixtures shall be minimum 6" and from power conduits minimum 12," minimum 48" from fan motors/transformers. All wiring in the J-hooks shall be securely clamped using the plenum rated tie-wrap, Part # "CATTRC," number as required.
2. Support from conduit stub-ups to the Cable Tray and in other areas to supplement tray system.

P. SURFACE RACEWAY (only where shown on drawings):

1. Manufacturers: [Wiremold 5400 Series] as detailed on the drawings.
2. Description: Non-metallic channel with fitted cover, suitable for use as surface non-metallic raceway, rigid PVC, UL listed for 600vac.
3. Finish: Factory applied standard ivory finish (or light gray).
4. Fittings, Boxes, and Extension Rings: Furnish manufacturer's standard accessories. Note: fittings bends specifically designed for Cat. 6 cable. Furnish and install all fittings and appurtenances for a complete installation, whether or not shown on the drawings or called out here-in.
5. Receptacles: Provide covers and accessories to accept receptacles and data outlets.
6. Receptacle Spacing: As indicated on Drawings.
7. Fittings: Furnish manufacturer's standard couplings, elbows, and connectors(see drawings for standard details).

8. Provide with divider wall for future power installation.

8.4 DATA DISTRIBUTION CABINETS-SERVER ROOM ONLY

- A. Floor Enclosure – Data/Server Cabinets shall be provided as shown on the drawings. Furnish features as shown on the drawings/detail and additional as called out herein:
 1. 19" Front rails, EIA-310, moveable front to back, universal mounting for servers
 2. 19" Back rails, EIA-310, moveable front to back, universal mounting for servers
 3. 6 receptacle 20 AMP, 120 VAC power vertical strip, surge protected.-two
 4. Cabinet Ground Lug (accept #6 AWG ground).
 5. Two Floor Clamps per cabinet (for bolting cabinet to floor).
 6. Top Hat shall contain up to 4-100 CFM fans, thermostatically controlled.
 7. Furnish quantity of Data Cabinets, factory assembled, as required by Owner.
 8. Lockable Front Door with Smoked Acrylic viewing window and vented each side vertically.
 9. Back door perforated
 10. Cable management
 11. Top Cable Entry Fitting.
 12. Removable "pop-out" sidewall.
 13. Nominal Size 32" w x 39" deep x 78 high".
 14. Furnish patch panels and wire management to mount inside the cabinet, same as an open rack.
 15. Manufacturers-CPI Megaframe or others that meet these requirements

8.5 DIVISION OF WORK

- A. Install metallic cable tray in accordance with NEMA VE 1, Application Information Section.
- B. Support trays. Provide supports at each connection point, at the end of each run, and at other points to maintain spacing between supports of 10 ft. maximum.
- C. Install such that joints are not made at support brackets.
- D. Install horizontal section support brackets between support point and quarter point of tray span.
- E. Provide ceiling trapeze for all horizontal cable tray.
- F. Install support within 2 feet on each side of expansion joints and within 2 feet of fitting extremity.

- G. Provide expansion joints in accordance with NEMA VE 1 for 25 degrees F maximum temperature variation.
- H. Install without exposed raw edges.
- I. Provide bonding jumper at each expansion joint and adjustable connection.
- J. Provide firestopping to sustain ratings when passing cable tray through fired-rated elements.
- K. Bond cable tray to provide grounding continuity with manufacturer's grounding straps over the entire length. Provide mechanical connectors for tray connection to Main Telecommunications Ground Bar.

8.6 SURFACE RACEWAY/WIRE TROUGH INSTALLATION

- A. Install Products in accordance with manufacturer's instructions.
- B. Use flat-head screws, clips, and straps to fasten raceway channel to surfaces. Mount plumb and level. Secure to building structures with anchor bolts on 3 foot centers (maximum). All raceway and wire trough shall be permanently mounted to the vertical surface (adhesive alone is not acceptable).
- C. Use suitable insulating bushings and inserts at connections to outlets and corner fittings.
- D. Close ends of wireway and unused conduit openings.
- E. Ground and bond raceway.

PART 9 CORING/SLOTTING/SLEEVING

9.1 SLEEVES:

- A. All wall penetrations shall be bored, and then sleeved, minimum is 1 inch metallic sleeve with plastic bushings or as required to size up. All floor penetrations shall be core drilled clean and true, and then installed with a metallic sleeve and plastic bushings on each side.
- B. The Contractor shall provide sleeves where required to protect equipment or facilities in the installation. Each sleeve shall extend through its respective floor, wall, or partition and shall be cut flush with each surface unless otherwise required.
- C. Sleeves in bearing and masonry walls, floors, and partitions shall be of standard weight steel pipe finished with smooth edges. For other masonry partitions, through suspended ceilings and for concealed vertical piping, sleeves shall be No. 22 U.S.G. galvanized iron.
- D. All sleeves shall be properly installed and securely cemented in place.

- E. Floor sleeves shall extend 3 inches above the finished floor. Space between floor sleeves and passing conduit shall be caulked with graphite packing and waterproof caulking compound as required for a waterproof installation. All floor sleeves shall be installed with plastic bushings to protect the cable, on both sides.
- F. Where conduits pass through waterproofed floors or walls, design of sleeves shall be such that waterproofing can be flashed into and around the sleeves.
- G. Sleeves through exterior walls below grade shall have the spaces between conduit and sleeve caulked watertight.
- H. Core drill one size larger than sleeve to accommodate the sleeve installation, caulk the void with watertight and fire rated sealing mastic (between bore and sleeve).

9.2 CHASES AND OPENINGS

- A. All openings or chases required for the installation of the telecommunications work in the building shall be provided by the Contractor.
- B. This Contractor shall seal all openings he has made in fire rated floors, ceilings or partitions after his work has been installed. The material used for sealing the openings shall have a fire rating equal to or greater than the rating of the floor, ceiling or partition material. All fire stop material shall be U.L. classified. Fire stop sealants, foams and compounds shall be as manufactured by 3M, STI, or Nelson. All floors minimum 2-hour rated fire stops and all corridor penetrations to classrooms or other areas.
- C. All Corridor Walls shall be considered fire rated and shall have a two hour fire stop also- the Contractor has the option to install a UL Classified Sleeve/Firestop Combination, for wall and floor applications; use the STI "EZ-PATH" System, 1.5" for corridor penetrations to classrooms and 4" for floors for risers and 4" for entering IDF's/MDF's from the corridor.

9.3 ACCESS PANELS

- A. The Electrical Contractor shall provide and turn over to the General Contractor for installation by him all access panels required by work under this electrical contract. Access panels shall not be smaller than 24" x 24" for access to concealed pull boxes, junction boxes or similar items where no other means of access is provided.
- B. Each access panel shall be all steel construction with a wall or ceiling frame and a hinged panel door. Doors shall be provided with full piano hinges and suitable clips and countersunk screws. Access panels shall have a one hour fire rating and shall be so labeled. Outside of access panels shall finish flush with finished wall or ceiling surfaces and be prime painted.

APPENDIX #1

THE SCHOOL DISTRICT OF PHILADELPHIA

CURRENT PRODUCTS (STANDARDS)

1. Network Architecture
 - 100 Base TX, Fast Ethernet (IEEE802.3u)
 - 1000 Base SX, Gigabit Ethernet (IEEE802.3z)
 - 1000 Base –T, GigE over copper(IEEE802.3 ab)
 - 1000 Base LX, Gigabit Ethernet (IEEE802.3z)
 - Wireless IEEE 802.11g
 - Protocols
 - TCP/IP (RFC1720)-OSI Compliant
 - AppleShare IP

2. Hardware
 - A. Routers
 - Nortel Networks
 - function provided in 8600 core switch-OSPF protocol
 - B. Hubs/Switches
 - Ethernet 10/100/1000 Base T
 - 1000 Base SX/LX., Gigabit Ethernet over Fiber
 - 100 Base FX, Fast Ethernet (IEEE802.3u)
 - support Telnet, Boot P, and TFTP
 - support MIB -II (RFC1213)
 - support RMON (RFC1757)
 - Nortel Networks- PROPRIETARY for Data Switches:
 - PassPort 8600 Layer 3 Core Switches-MDF
 - 5510 Stackable Switches
 - BPS 2000's (for Wireless to support RADIUS and EAP)
 - 802.3af PoE-either separate(PowerDSine 6024) or Nortel PoE-PWR switch product to power wireless LAN AP's

- Optera 3500 Metro for Optical WAN connections and handoff to 8600

B. Cabling EIA/TIA 568B Compliant minimum (568B pinouts)-Cat.6 drops

C. Network Management Any that read SNMP Agents RFC 1157 minimum

5. CATV hardware: Blonder Tongue, Toner, Pico
6. Computer Video Interface: Extron model CIA111-4
7. Video switch w/ stereo amplifier: Extron model MLS 406SA
8. Video switch: Extron model MLS 406
9. A/V control panel: Extron model MLC 226 IP
10. Master Clock: (wireless) Preferred Manufacturer: Primex
11. Master Clock: (wired) Preferred Manufacturer: Sapling
12. Classroom Remote control panel housing: Extron model MLM-WB+
13. Data Wireless Networking: AVAYA –AP6/AP8 Access Points-PROPRIETARY
 - a. Access Point (AP) in the Classroom to be protected with a non-metallic, plenum rated box, lockable, installed above the ceiling above the door or near the door. Antenna is mounted on the dropped ceiling in the classroom and cabled to the AP lockbox; use antenna attenuators to keep signal within classroom area. AP Lockbox shall be Hoffman #A48, or equivalent.
 - b. ALL AREAS OF STUDENT AGGREGATION SHALL BE COVERED FOR WIRELESS ACCESS IN ALL NEW SCHOOLS.
 - c. Design for 40% non-overlapping cells, use only non-overlapping channels 1,6, and 11.
 - d. Each AP 54 MBPS minimum unless otherwise directed by SDP IT Dept.
 - e. Power using 802.3af PoE from IDF's. Install in a separate rack in IDF's/MDF.
 - f. Connect Cat. 6 AP drop in ceiling to lockbox via a Cat. 6 patch cord.
 - g. Security: IEEE 802.1x and IEEE 802.11i standards employing EAP and RADIUS
 - (1) Utilize Wireless LAN Switch as a gateway from AP's to the network
14. PBX Systems-AVAYA –PROPRIETARY
 - a. Definity PRO LOGIX in MDF

- b. Connected to outside Centrex trunks
- c. Voice Mail is centralized at Administration Building-Octel Unit
- d. Classroom Phones-Analog standard 9 button trimline set, wall mount inside lock box recessed in the wall

APPENDIX #2

THE SCHOOL DISTRICT OF PHILADELPHIA

Reference the Attached DROPS/TYPES/LOCATIONS/COUNTS TABLE

Reference the attached Audio/Visual Example Diagrams

APPENDIX #3

THE SCHOOL DISTRICT OF PHILADELPHIA

SECURTIY SYSTEMS GUIDELINES