Peralta Community College District
Building Design & Construction Standards

~~March 2009~~ Edition

Prepared By:

WLC Architects, Inc.

LIST OF CONTRIBUTORS – 2008 VERSION

	Staff Participants	
General Services	Regina Stanback Stroud Chancellor	Peralta community college District 333 E 8th Street Oakland, CA 94606 (510) 466-XXXX
	Atheria Smith, Planning & Development	Peralta community college District 333 E 8th Street Oakland, CA 94606 (510) 466-XXXX
	Sharon Millman Planning & Development	Peralta community college District 333 E 8th Street Oakland, CA 94606 (510) 333-2286
Facilities Operations Department	Jason Busby Facilities Operations Dept.	Peralta community college District 333 E 8th Street Oakland, CA 94606 (510) 466-XXXX
	Scott Barringer Facilities Operations Dept.	Peralta community college District 333 E 8th Street Oakland, CA 94606 (510) 587-XXXX
	Curtis Tod Facilities Operations Dept.	Peralta community college District 333 E 8th Street Oakland, CA 94606 (510) 466-XXXX
	Ted Hoffman Facilities Operations Dept.	Peralta community college District 333 E 8th Street Oakland, CA 94606 (510) 466-XXXX
Information Technology	Antoine Mehouelleny IT Director	Peralta community college District 333 E 8th Street Oakland, CA 94606 (510) 466-XXXX
General Services		Peralta community college District 333 E 8th Street Oakland, CA 94606 (510) 466-XXXX
	Consultants	
Architectural, Format, Coordination	Kevin MacQuarrie, Principal Leo Ray-Lynch, Principal Ted St Germain, Project Manager	WLC Architects Inc. 2600 Tenth Street, Suite 500 Berkeley, CA 94710 (510) 450-1999
Mechanical, Electrical, Plumbing, Low Voltage, Technology	Hormoz Janssens, Principal Valeria Torres, Project Manager George L. Arellano, Associate	Interface Engineering, Inc. 717 Market St., Suite 500 San Francisco, CA 94103

INSTRUCTIONS FOR USING THE DISTRICT STANDARDS AND MATERIAL STANDARDS

Intent of Standards:
These standards have been developed by the Peralta Community College District (District) over several years to reflect the District's established needs and to assure a level of quality among the four college campuses: Berkeley City College, College of Alameda, Laney College and Merritt College. Portions of these standards were initially prepared by the District; they have now been updated by WLC Architects Inc, mainly to reflect criteria changes as a result of decisions made during the course of current bond construction projects that have been ongoing for over ten years.

The work on Berkeley City College reflects a continuity of decision-making, capturing and improving upon successful ideas used on a recent new building project. As such it is to be viewed as a tool to implement the standards of design set by the District without placing constraints on the proposed designs or inhibit the development of innovative and creative design solutions by any of the firms hired for upcoming projects.

However, the District over the years has developed some strong preferences, which it is hoped the architects will be honor-bound to follow. These fall into three categories: (a) District Sole-source products as determined by the Peralta Board of Trustees (Board), (b) General criteria that applies to the overall design effort, and (c) Materials, Finishes and Construction Criteria, that contains specific requirements, sorted into general categories which correspond to the Pre-2004 sixteen part CSI Division breakdown by building components. Following the three main sections of the Standards is additional material which elaborates on select subjects in more detail.

Complying with District Sole Source requirements:
The Board, in conjunction with its General Counsel, Thuy Thi Nguyen has affirmed the appropriateness of using certain products following procedures consistent with the California Public Contracts Code for competitively bided public works projects. Although each architectural firm may have a familiarity and preference for some products it has consistently used in the past, the District has determined strong preferences for certain specific items based on superior function, serviceability, ease of installation or replacement, and availability and long-term successful relationship based on service and reasonable pricing. The District is open to considering the use of new products, and encourages Architects to propose alternate materials to those in the Standards, but ultimately retains the right to adhere to the sole source policy until such time as the Board is willing to make changes to the Product List.

Interpreting the General Criteria:
The section on General Criteria summarizes issues which the designer will want to address in as early is the development of initial design program and elaborate on during the design development scheme. You will note that with many items throughout the Standards are not standardized. In these instances, you are to rely on your own experience and judgment to develop appropriate solutions. However, the District expects you to make and keep the District informed of your design and product selection through use of manufacturer's cut sheets and sample/color boards throughout the evolution of the Project.

Distributing information to your Design Team:
Immediately after you have been given the notice to proceed on a project, you are expected to furnish all of your consultants with this document. However, it is not enough to rely on your consultants to translate these requirements into your design program. We expect you to be fully

familiar with the issues covered in the District Standards, and that you remain knowledgeable and committed to assuring compliance by the entire design team throughout the duration of the project.

Dialog and coordination with the District:
As an Architect, you have been selected for this work, specifically because of your depth of experience and detail knowledge of educational facilities and their components. You may take issue with some of the contents of the Standards. The District welcomes your input in the process of continually improving them.

Peer Reviews and Compliance Monitoring:
The District may at various intervals during the preparation of your Bid Documents, particularly during the 100% Design Development drawings and outline specifications and the 75% Construction (pre DSA submittal) Document Preparation, to assure that all requirements of the Standards have been incorporated. Should the plans and specifications not be totally responsible to the Standards, the District may ask the Architect to revise the work, which could result in costly work for the architect and potential delays to the job.

The following information are Building Design Standard Guidelines to be used when developing scopes of work for the Peralta Community College District (PCCD). Manufacturer, products and model types are listed that represent the performance requirements that must be met, when specifying a design solution. ALL design solutions will be reviewed for approval by the District.

INDEX

REFERENCED PCCD BUILDING STANDARDS:P

1. **PCCD Door Hardware Specification Guideline**
2. **PCCD Signage Standards**
3. **PCCD Interactive Learning Environment Technology Standards**
4. **PCCD Information Technology Standards**
5. **PCCD Delta Energy Management System Controls**

I. GENERAL CRITERIA

• Code Compliance and Regulations.

The project design shall comply with provisions of these publications and the standards set forth herein and as applicable by the accepted codes and regulations including all revisions and amendments included at the current date of the project.

a. California Division of State Architect
b. California Code of Regulations, Title 24
c. California Building Code, Title 24 (CCR)
d. California Fire Code, Title 24 (CCR)
e. California Building Energy Efficiency Standards, Nonresidential Buildings, Title 24 (CCR)
f. California Mechanical Code, Title 24 (CCR)
g. California Electrical Code, Title 24 (CCR)
h. California Plumbing Code, Title 24 (CCR)
i. California Green Building Standards Code (CALGreen), Title 24 (CCR)
j. California State Fire Marshal, Title 19 (CCR)
k. Americans with Disabilities Act (ADA).
l. National Fire Protection Association – (NFPA)
m. California Occupational Safety and Health Association – (CAL-OSHA)
n. American National Standards Institute – (ANSI)
o. Federal Standards – (F.S.)
p. Underwriters Laboratories – (U.L.)
q. ASHRAE Handbook – Fundamentals (ASHRAE)
r. Air Conditioning and Refrigeration Institute – (ARI)
s. Sheet Metal and air Conditioning contractor's National association – (SMACNA)
t. North American Architectural Woodwork Standards – (NAAWS)
u. Architectural Woodwork Institute – (AWI)
v. Other applicable Codes and State Laws.

2. These Technical Standards apply to all modernization projects and new construction projects.

3. Project designs to consider maximizing safety during construction. Special attention should be given to vehicle traffic flow and mass movement of students on foot throughout the school.

4. The District should be contacted for the availability of the following reports: District ADA Report; Facilities Assessment Reports; Hazardous Materials Reports; Lead Paint Reports; Mold Reports; Environmental Site Assessments; Topographic Surveys and Geotechnical Reports.

5. The District Maintenance and Operations Department shall be given the opportunity to salvage materials, equipment and furnishings or include within the specifications instructions to direct the Contractor to salvage materials, equipment and furnishings such as flush valves, security system devices etc. Include these requirements in the contract construction document drawing's general notes.

6. The District (& Architect where applicable) will coordinate existing furniture, fixtures and equipment (FF&E) relocation and re-installation requirements. The District will furnish a list of new FF&E.

II. GENERAL TECHNICAL BUILDING REQUIERMENTS:

1. The Architect/ Engineer are encouraged to incorporate sustainable features into their design and construction practices; including recommending appropriate recycled materials for various construction applications, for approval by the District.

2. All products and materials are to contain low volatile organic compounds (VOC's), no formaldehyde and non-asbestos containing materials (ACM's).

3. Material Safety Data Sheets for all products shall be made available on site and submitted to the District prior to application.

4. As part of the bid package, the Contractor shall provide the District with a formal service agreement covering all labor and materials required to maintain effectively the installed system during the warranty period as well as the first year of the warranty period. All maintenance service during this period shall be recorded by the contractor on site.

5. Sole Source Vendors - If a project has these components the following vendors must be used and these products must be listed in the advertisement Notice to Bidders.)

   a. Fire Alarm Systems by Simplex/ Grinnell
   b. Door Closers by LCN
   c. Locksets by Schlage
   d. Exit Devices by Von Duprin
   e. Flush Valves by Toto
   f. Ives Hinge & Hardware
   g. Security System: J.C.
   h. Delta Controls – Energy Management System, Time Clocks & Lighting Controllers.
   i. CALE MP104 Ticket Machines

III. MATERIALS, FINISHES & CONSTRUCTION CRITERIA

Division 00 & 01

General Conditions: Peralta Community college district will provide the applicable specification sections specific for each project through the project construction manager.

Division 02 – Existing Conditions: The District has not standardized these sections.

Division 03 – Concrete: The District has not standardized these sections.

Division 04 – Masonry: The District has not standardized these sections.

Division 05 – Metals: The District has not standardized these sections.

Division 06 – Wood, Plastics, Composites:

General Notes:

1.	The Architect shall pursue the use of alternative, readily available and sustainable wood species, i.e. Yellow Cedar in lieu of Douglas Fir. Virgin Redwood is not permitted; provide Red Cedar in lieu of Redwood.

Section 06 41 00 - CASEWORK CRITERIA

1.	Provide a survey of existing cabinetry. The architect shall provide a matrix indicating the general condition (good, fair, poor) of the cabinetry. Based on the survey results, a decision will be made by the District and shall determine if the cabinets will be refinished or replaced.
2.	Casework conform to the most current version of the North American Architectural Woodwork Standards (NAAWS) 'Custom Grade' standards throughout; with the exception of Science Labs which shall conform to NAAWS 'Premium Grade' standards. Architects should note that NAAWS standards permit the use of particle board frames instead of hardwood, regardless of the grade. It is strongly advised that specifications call for solid hardwood under all hinges and other hardware subject to heavy use, pullout or vandalism. Architect should enforce this requirement when reviewing Contractor's shop drawings.
3.	All millwork and installation shall be monitored for compliance under the scope of the WI monitored compliance program (MCP). The architect shall provide the district a written report showing the results of inspection provided by the WI Inspection Service.
4.	Wherever practical, Architect is encouraged to specify 'all wood' solid-stock casework, especially in libraries and other rooms subject to joint-use or heavy occupancy. Chemical resistant plastic laminate is not acceptable in laboratory classrooms, 'all wood' solid-stock or phenolic resin casework is encouraged.
5.	Glass door cabinets are only acceptable for upper casework in laboratory classrooms. Where glass doors are used glass shall be one quarter (1/4) inch clear laminated safety glass with all exposed edges ground.

6.	Glass shelves are not acceptable in any laboratory or classroom.

Division 07 – Thermal and Moisture Protection

Section 07 50 00 – MEMBRANE ROOFING & Section 07 30 00 – STEEP ROOFING CRITERIA

1.	GENERAL
1. A.	Comply with the National Roofing Contractor's Association (NRCA) "Roofing and Waterproofing Manual" and "Quality Control Guidelines for Application of Polymer-Modified Bitumen Roofing" as appropriate for materials and application procedures for roofing system selected. Reference compliance with NRCA in specifications.
1. B.	Whenever practical, architect is to specify Single Ply Thermoplastic Membrane Roofing from The Garland Company, Inc. for roofs sloped less than 4:12. Roof system shall meet the requirements of a cool roof with minimum reflectance of 0.70 and a minimum emittance of 0.75.
1. C.	Roofing system design shall be per the manufacturer's recommendations.
1. D.	Roofing system design shall be for 30-year warranty system with single source supply of roofing materials, flashing & accessories.
1. E.	Roofing system design should incorporate all aspects of roof waterproofing. When partial roofing is done complete area separations must be used.
1. E. 1.	- Roofing system assembly shall have a U.L. Class A Fire Rating. - Roofing system assembly shall meet Fire Marshal requirements for wind uplift rating. - Roofing system shall meet CRRC criteria and have CRRC number for the specified system.
1. F.	Qualifications:
1. F. 1.	Roofing materials manufacturer shall be nationally recognized and shall have had a minimum of five years continuous service manufacturing roofing products.
1. F. 2.	Applicator shall be certified as approved by roofing materials manufacturer and shall have a minimum of five years continuous experience with similar system applications.
1. G.	Nominally flat roof systems are not desired. They will be allowed only, where conditions allow no other solution. In which case; roof systems of nominally flat roofs shall slope a "minimum" of one quarter (¼) inch per foot to roof drains.
1. H.	Locate roof drains at points of maximum deflection on roof structure; do not locate adjacent to columns, beams or bearing walls. Where possible, drains to be sumped a minimum of two (2) inches.
1. I.	Avoid interior downspouts. Locate downspouts to permit discharge into storm-drain system, or on grade. Do not locate downspouts in path of travel or areas normally used by students.

1. J.	Specify that all existing downspouts and storm drain line connectors shall be cleared of existing gravel and debris. Use schedule 40 galvanized or equal below 8'-0" AFS.
1. K.	Verify load-carrying capability of existing roof structure before providing re-roofing system requiring ballast or insulation.
1. L.	Wherever possible, consolidate or group together roof penetrations to utilize a common curb for flashing.
1. M.	Provide traffic pads (walkways) on roof only to and around equipment requiring maintenance.
1. N.	Do not construct equipment supports directly on roofing membrane. Provide elevated roof platform to minimize membrane penetrations.
1. O.	Nominally flat roof shall terminate within twenty-four (24) gauge gravel stop with continuous cleat or a minimum four- (4) inches high cant strip at the roof edge, with twenty-four (24) gauge GSM, Kynar-coated coping metal.
1. P.	Use Roofing Type New Buildings: Cool-applied Built Up Roofing (BUR) assembly consists of three (3) plies of a prefabricated, reinforced, homogenous styrene-butadiene-styrene (SBS) base sheet (inner-ply plies in cold asphalt and finish ply applied in cold adhesive for nominally flat roofs); applied over rigid insulation over wood, concrete, or metal deck; polyisocyanurate rigid insulation mechanically fastened, with one-half (½") inch cover board with embedded glass matt faces mechanically fastened. Minimum R value for system shall meet current code requirements. Surfacing shall be CRRC approved white aggregate set in white adhesive.
1. Q.	Use Roofing Type Maintenance & Modernization Projects: Cold-applied Built Up Roofing (BRU) system as specified herein applied over mechanically fastened insulation installed with R value meeting current code requirements applied over existing wood, concrete, metal deck. Base sheet shall be mechanically fastened, interply applied in asphalt, finish ply applied in asphalt and mechanically fastened at head laps, and flashing plies on roof slopes greater than two in twelve (2:12) inches and less than three in twelve (3:12) inches, surfacing of membrane finished with CRRC white aggregate set in white adhesive.
1. R.	Use asphalt composition roofing shingles on roof slopes greater than three (3) inches in twelve (12) inches, unless otherwise approved by the District.
1. S.	Specify spring-lock flashing to allow re-roofing without removal & repair of wall assembly.
1. T.	Specify gutters at all sloped roof eave conditions. Size for Alameda County area rainfall and detail to provide overflow away from the building.
1. U.	Specify a pre-roofing conference. The District may retain a testing and inspection agency.

1. V.	Provide access to all roofs at either roof hatches or doors. Access to roofs through window or ladders accessible from the ground is not acceptable. Access to roof from within the school (i.e. mechanical room or attic space) is the preferred alternate.
1. W.	Provide ladders for access from one roof to another if no inside hatches are provided. Provide side railings at ladders and safety rings.
1. X.	Provide adequate flashing at conditions to prevent windblown water.
1. Y.	Specify screening over roof drains and overflows to prevent clogging of drains and animal access.
1. Z.	Specify roofing manufacturer's attendance at pre-roofing conference and inspection during installation.
1. AA.	Specify testing for water tightness prior to acceptance of the work.
1. BB.	Specify roofing manufacturer's attendance at pre-roofing conference and inspection during installation. Contractor to provide pre-construction photos for all pre-existing conditions.
1. CC.	Specify written warranty on labor and materials, signed by Contractor and principal material supplier, agreeing to maintain the roofing system installation in a watertight condition for a period or thirty (30) years from date of acceptance of the work.
1. DD.	Provide cast-iron downspouts, external to building to a height of 20'-0" from finish grade.

Section 07 72 23 - BUILDING RELIEF CRITERIA

1.	**Building Relief Criteria:**
1. A.	Provide building pressure relief in all spaces that are pressurized due to minimum outside air introduction or due to economizer outside air introduction. Adequate relief shall be provided so that ADA Door Closure Requirements are met in all rooms. Relief may be provided by relief hoods or louvers with motorized backdraft dampers interlocked to open when heating/venting unit is on, or by providing heating/venting units with accessory modulating power exhaust systems that are controlled by room static pressure.

Division 08 – Openings

Section 08 10 00 - DOORS AND FRAMES & Section 08 70 00 - DOOR HARDWARE CRITERIA

1.	**GENERAL**
1. A.	The architect shall provide a survey, with the District Maintenance & Operations Department present for the walk-through, of existing doors & frames and door hardware. A matrix will be provided for the general condition (good, fair, poor) of the hardware. Based on the survey results, the architect shall make a decision which doors and frames and door hardware must be replaced.

1. B.	Doors:
1. B. 1.	Provide concrete landing outside of all new exterior doors, for full extent of door swing area and of width sufficient to comply with ADA.
1. B. 2.	In all lanes of travel, new doors should be “right-hand reverse” swing wherever possible.
1. B. 3.	Provide interior staved lumber core of Douglas Fir, (or equal) with no joints occurring at stile and rail connection points. No formaldehyde.
1. B. 4.	Interior doors in wet locations shall be considered moisture-proof; FRP, factory finished aluminum doors or laminated solid wood core doors are acceptable, situation dependent and shall be reviewed with the District Maintenance & Operations Department.
1. B. 5.	Existing doors and frames, (in good condition), shall be reused. All hardware shall be replaced, as required, to meet the Americans with Disabilities Act (ADA) requirements.
1. B. 6.	Exterior Doors: Typically, exterior doors and frames shall be galvanized steel doors and frames, SDI grade III extra heavy duty with bitumen back-primer, door frames to have continuous welds and no seams. However, solid wood doors, aluminum storefront doors or FRP doors are acceptable, situation dependent and shall be reviewed with the District Maint. & Operations Dept. prior to specifying. Steel doors shall be center seamed “Ceco Medallion”, or equal.
1. B. 7.	High-use area doors shall be metal and shall be used at the following locations (alternate materials will be considered by the District, situation dependent):
1. B. 7. a.	Cafeteria
1. B. 7. b.	Gymnasiums and Locker Rooms
1. B. 7. c.	Public Use Rooms
1. B. 7. d.	Pool area
1. B. 7. e.	Main entrances (Store Front doors are acceptable subject to District Approval)
1. C.	**Door Hardware:**
1. C. 1.	Hanging Devices:
1. C. 1. a.	Continuous Hinge by “Ives”, Model No. **224XY**; Finish – CL. ***Use continuous hinges at high traffic openings, exterior doors, gyms, etc.***
1. C. 1. b.	Butt Hinge by “Ives”, Model No. **5BB1HW x NRP**; finish – 630 Model No. **5BB1**; Finish – 652

1. C. 2.	Securing Devices:
1. C. 2. a.	Cylindrical Lock Sets by "Schlage": Model No. **ND Series x Rhodes**; Finish - 626 Model No. **ND10S** Passage Lock; Finish - 626 Model No. **ND40S** Passage Lock; Finish - 626 Model No. **ND91BD** Office Lock; Finish - 626 Model No. **ND95BD** Classroom Security Lock Keyed with indicator Rose XN12-035; Finish – 626 Model No. **ND96BD** Storeroom Lock; Finish - 262
1. C. 2. b.	Mortise Lock Set by "Schlage" Model No. **L9485B 06A x L282-722** Faculty Restroom Lock; Finish – 626
1. C. 2. c.	Exit Devices by "Von Duprin", Model No. **CDSI-PA-AX-99NL x VR910-NL** (single doors); Finish – US26D Model No. **CDSI-PA-AX-99NL x VR910-NL x CDSI PA-AX-99DT x VR910-DT x SNBx KR4954 Mullion x 154** (paired doors); Finish – US26D ***All mullions to have set of #154 Stabilizers.***
1. C. 2. d.	Rated Exit Devices by "Von Duprin", Model No. **PA-AX-99L-2SI-F-996L** (fire rated single doors); Finish – US26D Model No. **PA-AX-99L-2SI-F-996L x PA-AX99EI-F x KR9954 Mullion x 154** (fire rated paired doors); Finish US26S ***All mullions to have set of #154 Stabilizers.***
1. C. 2. e.	Key System by "Schlage": Everest Patented Keyway Small Format Interchangeable Core Model No. **80-037** Interchangeable Core; Finish 262 Model No. **80-329** Rim Cylinder Interchangeable Core; Finish 262 Model No. **80-302** Mortise Cylinder Interchangeable Core; Finish 262 ***PCCD to verify Schlage Everest "B" Keyway for each site.***
1. C. 2. f.	Auxiliary Locks by "Schlage": Model No. **CL721G** Cabinet Locks; Finish 626 Model No. **CL771G** Drawer Locks; Finish 626
1. C. 2. g.	Padlocks by "Schlage": Model No. **KS** Series for Small Format Interchangeable Core; Finish US26D
1. C. 2. h.	Coordinator by "Ives": Model No. **COR x FL x MB** (Storage & Utility Rooms); Finish USP ***Only use where required by Fire Code.***
1. C. 2. i.	Flush bolts by "Ives": Model No. **FB31P** (Automatic) (Metal doors) (Storage & Utility Rooms); Finish US26D

	Model No. **FB41P** (Automatic) (Wood doors) (Storage & Utility Rooms); Finish US26D Model No. **FB51P** (Manual) (Metal doors) (Storage & Utility Rooms); Finish US26D Model No. **FB61P** (Manual) (Wood doors) (Storage Rooms); Finish US26D
1. C. 2. j.	Multi-Technology Card Reader by "Schlage": Model No. **MT11** (Mullion Mounting) Model No. **MT15** (Single Gang box) Model No. **MTK15** (Single Gang box w/ keypad) **Furnished and installed at all exterior doors, computer labs, and rooms and offices used for money handling, record storage, and rooms where security is primary concern for the district.**
1. C. 2. k.	Electronic Strike by "Von Duprin": Model No. **5100 Series** Electronic strike for ND series lock (Finish US SP28) Model No. **6100 Series** Electronic strike for rim exit devices (Finish US32D) Model No. **6300 Series** Aftermarket applications for rim exit devices (Finish US32D) **Furnish and install at all doors with multi-technology card reader.**
1. C. 3.	Closing Devices:
1. C. 3. a.	Closer by "LCN": Model No. **4040XP RW/PA/TB**; Finish 689 **Furnished and install all door closers with thru bolts** ***All door frames to be reinforced for soffit shoe.***
1. C. 3. b.	Auto Operators by "LCN": Model No. **9530**; Finish Aluminum Model No. **9540**; Finish Aluminum Model No. **9550**; Finish Aluminum
1. C. 3. c.	Actuator by "LCN": Model No. **8310-836T**; Finish Alum.
1. C. 4.	Stops & Holders:
1. C. 4. a.	Door Holder by "Ives": Model No. **WS45** (Automatic Holders & Stops); Finish – US26D Model No. **FS43** (Automatic Door Stops & Holders); Finish – US26D
1. C. 4. b.	Door Stop by "Ives": Model No. **FS436** (Interior Floor Stops); Finish – US26D Model No. **FS18S** (Security Floor Stops); Finish – Black Model No. **WS401/WS402** (Wall Stops); Finish – US26D
1. C. 5.	Accessories:
1. C. 5. a.	Kick Plate by "Ives": Model No. **8400** series; Finish – US26D

1. C. 5. b.	Mop Plate by "Ives": Model No. **8400** series; Finish – US26D
1. C. 5. c.	Push/ Pull Plates by "Ives": Model No. **8200/ 8300** series; Finish – US26D
1. C. 5. d.	Latch Protector by "Ives": Model No. **LG12**; Finish – US32D
1. C. 5. e.	Thresholds by "ZERO": Model No. **654A**; Finish – Aluminum Model No. **655A**; Finish – Aluminum Model No. **623A**; Finish – Aluminum ***Architect to coordinate with project conditions. Set thresholds in a full bed of butyl-rubber or polyisobutylene mastic complying with requirements in Division 7 "Thermal and Moisture Protection". Use ¼" fasteners, red-head flat-head sleeve anchors (SS/FHSL)***
1. C. 5. f.	Automatic Door Bottoms by "ZERO": Model No. **360AA**; Finish – Clear
1. C. 5. g.	Door Sweep by "ZERO": Model No. **328AA**; Finish – Clear
1. C. 5. h.	Weatherstripping / Smoke Seal by "ZERO": Model No. **488S-Bk** (at frame); Finish – Black
1. C. 5. i.	Mullion Seal by "ZERO": Model No. **8780N** (at mullion); Finish – Black
1. C. 5. j.	Gasketing / Perimeter Seal by "ZERO": Model No. **429A**; Finish – Aluminum Model No. **328AA**; Finish – Clear Model No. **326AA**; Finish – Clear
1. C. 5. k.	Astragal by "ZERO": Model No. **328AA**; Finish – Clear Model No. **44STST**; Finish – Aluminum
1. C. 5. l.	Door Silencer by "Ives": Model No. **SR64** series; Finish – Gray
1. C. 5. m.	Drip Guard by "ZERO": Model No. **142A** (Exterior doors exposed to rain); Finish – Aluminum
1. C. 5. n.	Power Supply by "Schlage": Model No. **PS902** **Furnish and install at all doors with electronic strike.**

1. C. 6.	Keyways:
1. C. 6. a.	Keyways by "Everest" Model No. **B124** (at Merritt and College of Alameda) Model No. **B123** (at Laney College, Berkeley City College and District Offices)

Section 08 50 00 – WINDOW CRITERIA & Section 08 80 00 – GLAZING CRITERIA

1.	Stops shall be removable only from interior using vandal-proof screws. Exterior stop shall be integral with frame. Double-hung or horizontal sliding windows are preferred. If 'hopper' or 'casement' windows are strongly preferred by Architects, they shall not project onto adjacent exterior walkways or into interior curtains or mini-blinds. Use of high windows requiring operating cranks is to be avoided.
1. A.	Window frames should be commercial grade anodized aluminum construction with thermal breaks. Anodizing should match campus standard color unless otherwise approved by the district.
2.	New Glazing:
2. A.	Exterior: Insulating Duel Pane: ¼" Clear laminated glass, ½" air space, ¼" Clear heat strengthened fully tempted glass with low-e coating on number 2 surface. With safety glazing and fire rated glazing where required by code.
2. A. 1.	Window tinting and films should be reviewed with the district for approval. Selected colors should complement the existing campuses unless otherwise approved by the district.
2. B.	Interior: Single Pane one quarter (¼) inch clear laminated glass (1/8" plate + .030 laminate min. + 1/8" plate), with safety glazing and fire rated glazing where required by code.
3.	Replacement Glazing:
3. A.	Single pane one quarter (¼) inch laminate, (1/8" plate + .030 laminate min. + 1/8" plate) to be used at all new and glazing replacements; or an impact resistant material where approved by the district.
3.	Toilet, shower and locker room windows to be obscure glass.
4.	Window assemblies should meet the following codes: - ANSI Z97.1: Standard for safety Glazing Materials Used in buildings - NFPA 80: Standard for fire door and fire windows - NFPA 257: Standard for fire test for windows and glass block assemblies - UL 9: Fire Test for windows assemblies

Section 08 90 00 - LOUVERS & VENTS CRITERIA

1.	Architects drawings shall include a louver schedule.
2.	Architect's details shall indicate stainless steel or other non-ferrous anti-vandalism screens applied with tamperproof fasteners over all louver assemblies occurring below 9 feet above grade. Select screen fabric based on minimum 10 gauge 60% perforation and oversize the louvers accordingly.

Division 09 – Finishes

Section 09 20 00 - WALL FINISHES CRITERIA

1.	Comply with the Gypsum Association (GA) “GA-216: Application and Finishing of Gypsum Panel Products” and “GA-600: Fire Resistance and Sound Control Design Manual” as appropriate for materials and application procedures for gypsum products. Reference compliance with GA in specifications.
2.	Use 5/8-inch gypsum wallboard throughout; except in corridors use impact-resistant wallboard, rated where required. Do not use gypsum board in toilet rooms, wet areas, or otherwise indicated in program. Recommend a level 4 finish per the Gypsum Association “GA-214: Recommended Levels of Finish for Gypsum Board” with a spatter and light orange peel finish, except where a cleanable finish is required recommended level 5 finish per GA “GA-214”.
3.	Wall finishes should be extended to include any ceilings and soffit surfaces below 9 ft. above finish floor.
4.	Classroom and library wall should have a ‘natural’ break, usually aligned with the top of the door or at the 8 foot level, with some articulated molding that permits typical wallboard finish above with optional tack able wallboard. Also, it is recommended that only hard surfaces be provided on portion of the walls below 30 inches above the floor.
5.	Walls in kitchen and other sanitary areas should be smooth (Level 5) moisture-resistant gypsum wallboard, capable of accepting a conventional epoxy paint finish.
6.	Walls shall be Cementitious Backer board in restrooms, shower and “wet” areas, with a thin set of latex Portland cement mortar to level out irregularities and capable of accepting 6” x 6” square ceramic tile finish.
7.	All exterior walls and walls in all wet areas shall be set on raised 6” inch concrete curbs.
8.	Architect shall provide ‘a Coordination Drawing layer’ showing all pilasters and recesses, cabinetry and casework, exposed contiguous structural members, mechanical outlets, wall lighting, plumbing fixtures, access panels and all other wall penetrations or applied fixture lay out, coordinated to resolve conflicts between trades.

Section 09 50 00 - CEILING CRITERIA

1.	Use suspended acoustical lay-in ceilings except in corridors (situation dependent), toilet rooms, wet areas, or where otherwise indicated in program. Recommended new construction for corridor ceilings shall be acoustical tile applied to five-eighths (5/8)-inch gypsum board backing.
2.	Ceiling height shall not be less than eight (10) feet – six (6) inches clear.
3.	In showers and wet areas ceilings shall be washable and shall be cement plaster or waterproof gypsum wall board.

4.	Specify that Contractor shall provide 'Coordination Drawings' showing the work of all structural, mechanical, lighting, plumbing, access panels and sprinkler location lay out & coordinated with conflicts noted.
5.	Equipment above the Ceilings:
5. A.	Provide access to all equipment. Where mechanical units are installed and concealed above new ceilings, access for servicing must be provided. All other alternatives for locating units should be exhausted prior to installing units above the ceiling or on the roof. Size, location and type of access panels must be coordinated with location and requirements of the equipment and so indicated on the construction documents.
5. B.	Occasional access may be through acoustical lay-in tile panels in a suspended T-bar grid ceiling. Access for filter replacement or other frequent access requirements should be by hinged panels, or use lay-in material less subject to damage.
5. C.	Grid pattern of new T-bar ceilings and location of mechanical equipment must be coordinated and shown to avoid T-bar obstruction where clear access is required. Indicate required clear access areas on the construction documents.
5. D.	Acoustical Lay-In Panels:
5. D. 1.	Fine fissured texture with Humigard Plus no-snag technology. 24-inch square units, with square edges, unless otherwise approved by the district.
5. D. 2.	Finish and color: Factory applied, washable latex acrylic, mildew and mold inhibiting Bio Block paint on Dura Brite acoustically transparent membrane in manufacturers standard white color, unless otherwise approved by the district.
5. D. 3.	Acoustical ratings: - Noise Reduction Coefficient (NRC) of point seven (0.70). - Ceiling Attenuation Class (CAC) of thirty-five (35). - Light reflectance of point nine (0.90).

Section 09 60 00 - FLOORING CRITERIA

1.	**Flooring Type & Location**
1. A.	Linoleum or bio-based tile flooring:
1. A. 1.	Acceptable Manufacturers: Mannington, Armstrong or equal. Proposed flooring should be a "no-wax", "no-Polish" type to reduce maintenance protocol. Colors to be approved by the district. Ten (10%) Percent of each color specified shall be retained by the district for backstock.
1. A. 2.	Linoleum or bio-based tile flooring locations:
1. A. 2. a.	Administrative Office – Public Area Lobby (situation dependent)
1. A. 2. b.	Cafeteria
1. A. 2. c.	Classrooms
1. A. 2. d.	Circulation hallways (reviewed on a case by case basis)

1. A. 2. e.	Entry Vestibules (reviewed on a case by case basis)
1. A. 2. f.	Intermediate Data Frame Room (IDF)
1. A. 2. g.	Main Distribution Room (MDF)
1. A. 2. h.	Media Center
1. A. 2. i.	Multi-Use Facilities (except aisle-ways which are carpeted)
1. A. 2. j.	Nurse's Room
1. A. 2. k.	Nurse's Restroom
1. A. 2. l.	Sink/counter (wet)
1. A. 2. m.	Staff restrooms areas
1. A. 2. n.	Faculty and Administrative Storage Areas (interior)
1. A. 2. o.	Supply Rooms
1. A. 2. p.	Warming Kitchens
1. A. 2. q.	Work Rooms
1. A. 3.	Vinyl Composition Tile (VCT) flooring may be provided at the same locations suitable for Linoleum flooring. Proposed VCT should include a minimum post-consumer recycled content of 25%. Acceptable manufacturers are Mannington, Armstrong, or approved equal. Ten (10%) Percent of each color specified shall be retained by the district for back stock.
1. B.	**Capet Flooring:**
1. B. 1.	Provide carpet tiles and floor sealer (24 oz. carpet face, ½" pile height maximum, with hardback tile capable of being installed over moisture content level of 95% RH).
1. B. 2.	Acceptable manufactures: C&A / Tandus, Interface, or approved equal. Ten (10%) Percent of each color specified shall be retained by the district for back stock.
1. B. 3.	Carpet tile flooring locations:
1. B. 3. a.	Administrative Staff Area
1. B. 3. b.	Conference Rooms
1. B. 3. c.	Faculty Lounge (except at wet areas)
1. B. 3. d.	Library
1. B. 3. e.	Offices
1. B. 3. f.	Multi-Use (aisles)

1. C.	**Flooring and Wall Tile:**
1. C. 1.	Provide sloped floor to drain ceramic tile flooring and wainscot with cement board backer per American Tile Institute Standards in the following locations (at concrete floors provide 6” concrete curb at all new walls). Ceramic tile on floor to shall be 12” x 24” x 3/8”, unpolished; Ceramic tile on walls shall be 6” x 6” x 1/4", unpolished and extend to finished ceiling. Accent colors shall be limited to 2 floor and 2 wall accents:
1. C. 2.	Flooring and Wall Tile locations:
1. C. 2. a.	All student toilet rooms. Staff toilets shall have 4” coved base in lieu of wainscot.)
1. C. 2. b.	Locker Shower Areas
1. C. 3.	Grout for ceramic tile shall be per the Tile Council of North America “Handbook for Ceramic, Glass, and Stone Tile Installation” for the particular application. Final grout color to be approved by the district.
1. D.	**Quarry Tile Flooring:**
1. D. 1.	At all new construction provide sloped to drain quarry tile flooring with integral sand finish and with quarry tile cove base per American Tile Institute Standards at the following locations (at concrete floors provide 6” concrete curb at all new walls):
1. D. 2.	Quarry Tile Flooring locations:
1. D. 2. a.	Kitchen
1. E.	**Sealed Concrete Flooring:**
1. E. 1.	Provide sealed concrete (Concrete Sealant shall be solvent based, non-yellowing acrylic copolymer concrete curing, sealing, and dustproofing compound) at the following locations:
1. E. 2.	Sealed Concrete Flooring locations:
1. E. 2. a.	Locker Rooms
1. E. 2. b.	Ball/Athletic Equipment Closets
1. E. 2. c.	Heating/mechanical Closets
1. E. 2. d.	Play Equipment Closets
1. E. 2. e.	Traffic Safety Equipment Closets.
1. E. 2. f.	Janitor’s Closets, Maintenance Storage Rooms
1. F.	**Wood Flooring:**
1. F. 1.	Species, color, and finish to be reviewed and approved by the district prior to specification.

1. F. 2.	Wood flooring locations:
1. F. 2. a.	Gymnasiums
1. F. 2. a.	Dance and Aerobic Classrooms
1. F. 2. a.	Squash, Handball and Raquetball
1. F.	**Rubber Flooring:**
1. F. 1.	Rubber sheet flooring conforming to ASTM F1344, Class 1. Color, finish, and texture are to be reviewed and approved by the district prior to specification.
1. F. 2.	Acceptable manufacturers: Burke and Mondo Flooring or approved equal.
1. F. 3.	Rubber Flooring may be proposed for high traffic areas, wet areas, sports surfaces, or areas where maximum slip-resistance or sound absorption is desired.
1. H.	Rubber base shall be four (4) inches high, top set in minimal 10'-0" lengths, coved; with pre-molded inside and outside corners throughout.

Section 09 90 00 - PAINTS & COATINGS CRITERIA

1.	A Committee shall be established consisting of Community Members, Site, Staff and District Personnel to review and approve exterior paint colors during the design phase.
2.	All materials applied, mill thickness and subsurface prep must be in accordance with manufacturer's recommendations and shall be factory mixed.
3.	Specifications should include the removal and reinstallation of any new or existing signage required for painting, such as room numbers, fire life safety, boiler room, etc.
4.	Acceptable Manufacturers (premium lines only):
4. A.	Benjamin Moore, premium paint line, or District approved equal.
4. B.	Dunn Edwards, premium paint line, or District approved equal.
4. C.	Sherwin Williams, premium paint line, or District approved equal.
5.	Finish for Interior: Walls and ceilings shall be semi-gloss. A flat finish on acoustical ceilings will be reviewed on a case by case basis.
6.	Contractor shall provide a 'PAINT COLORS' matrix. This form shall require the contractor, after review by architect, to list the approved colors used at a school for reference by the District Maintenance and Operations and by the school site.

Division 10 – Specialties

Section 10 11 00 - CHALKBOARD & MARKER BOARD CRITERIA

1.	Chalkboards may remain if they are in good condition. Damaged chalkboards shall be replaced with magnetic marker boards or chalkboards. New marker boards and chalkboards shall have map rail strips and hooks and trays for markers or chalk.

Section 10 11 23 - TACKABLE WALL SURFACE CRITERIA

1.	Tackable wall surface shall be breathable (mold resistant) fabric wall-covering, or equal. Panels shall be arranged so that the factory edge occurs every four feet vertically, and that top and bottom cut edges are concealed by overlapping trim or wainscot.

Section 10 14 00 - SIGNAGE STANDARDS

1.	Signage to be installed per Peralta Community College District Signage Standard Manual *2008* Edition.

Section 10 21 13 - TOILET COMPARTMENTS CRITERIA

1.	Solid Color Reinforced Composite, floor to ceiling two-point anchorage, with continuous mounting brackets. - All hardware shall be stainless steel fittings.
2.	Acceptable Manufacturer:
2. A.	Bobrick - No substitution. Color – To be selected by Architect.
3.	Graffiti resistant

Section 10 28 13 - TOILET ACCESSORIES

1.	Contractor to salvage accessories for reinstallation at site or for pick-up by District.
2.	All toilet accessories to be supplied by the District and installed by the Contractor. The Architect/Contractor are responsible for obtaining blocking requirements from the Manufacturer.
2. A.	Accessible Grab Bar – Bobrick Model No. B-6806
2. B.	Paper Towel Dispenser “Kimberley Clark Hands Free #09990 (Black)” (This dispenser will accommodate Kimberley Clark Paper Towel #01000)
2. C.	Soap Dispensers – GoJo/FMX-20/Gray/#5250-06 (No substitution) (This dispenser will accommodate GoJo/Luxury Foam Antibacterial Hand Wash FMX-20, 2000 ml refill #5262-02, no substitution)
2. D.	Coreless Jumbo Roll Bath Tissue Dispenser – Kimberley Clark #KCI 09608 (smoke/gray) (This dispenser will accommodate Kimberley Clark Jumbo Roll Bath Tissue #07006)
2. E.	Recessed Seat-Cover and Toilet Tissue Dispenser – Bobrick Model No. B-3474 / B-3574
2. F.	Surface Mounted Multi-Roll Toilet Paper Dispenser – Bobrick Model No. B-4288. This dispenser will need to be able to accommodate a size 4.5” x 4.5” toilet paper.
2. G.	Seat Cover Dispenser – This dispenser must be able to fit ½ fold seat covers Bobrick model No. B-3013.
2. H.	Sanitary Napkin / Kotex Vendor – Bobrick Model No. B-47069

2. J.	Sanitary Napkins / Kotex Disposal – Bobrick Model No. B-270
3.	Trash Receptacle – Must be able to fit a 37” by 48” and/or 40” by 48” trash liner.
4.	Mirrors shall be provided and installed by the contractor. All mirrors shall be tempered glass, with scratch and graffiti resistant coatings.
5.	Baby Changing Station – Koala Kare Model No. KB110-SSRE
6.	Utility Shelf with Mop / Broom Holders – Bobrick Model No. B-239

Section 10 51 00 - LOCKERS CRITERIA

1. A. 1.	**Athletic team lockers:** shall be heavy duty double tiered, 15” width x 12” deep by 30” high, with stainless steel recessed handles.
1. A. 2.	**Locker room lockers:** shall be double tiered, 15” width x 12” deep x 24” ht. Each locker room shall also have up to 100 max.
1. A. 3.	**Full height lockers:** 15” wide x 12” deep x 60” height, for team sports.
1. B.	Locker frame shall be welded box design, with riveted hinges allowing for easy door replacement.
1. C.	Lockers shall be non-vented at exterior applications, vented at interior applications.
1. D.	Lockers shall have single prong ‘J’ hook on 3 sides and a double prong ceiling hook.
1. E.	Standard locker lock shall be padlocks supplied by the school.
1. E. 1.	Accessible locker lock shall be provided with a digital lock assembly manufactured by Zephyr Lock or District approved equal.
2.	Lockers Acceptable Manufacturers:
2. A.	DeBourgh Mfg. Co., Penco Products, or District approved equal.
2. B.	Latching Device: Heavy-duty gravity, auto, or single-point, on a case-by-case basis.

Division 11 – Equipment: The District has not standardized these sections.

Division 12 – Furnishings

Section 12 24 13 - WINDOW SHADES CRITERIA

1.	Architect shall provide layout drawings for shade installation showing section elevation through shades and operating (cam) handles. Shade configuration drawings can be included with the sill, jamb and head window details. Shades to be “Mecho” Multi-band Shades with band for room darkening.
2.	In general, Districts prefer the use of ‘Mecho’ shade screens in the Administration area and libraries because they filter light but permit the staff to monitor activities outside the building. Note: if you are using blackout curtains or shades for skylights

	and clerestories you must provide for power operation and coordinate the location of power source and junction box with your Electrical Subconsultant.
3.	Sample Installation: Prior to fabrication, vendor/contractor shall contact the District to arrange sample installation for review and acceptance by the Architect. Window hardware, such as handles, need to be installed in coordination with shade hardware. Mounting brackets for shades shall not be installed on window stops.
4.	Field verification should show that shades are installed with clearance, for window operation level and plumb, secure for unencumbered operation. There should be one shade system unit per lite (window sash section).
5.	Science Labs shall have blackout shades with side channels manufactured by Draper, or equal.

Division 13 – Special Construction

Section 13 11 00 - SWIMMING POOL

1.	**Swimming Pool**
1. A.	The swimming pool shall support the following programs:
1. A. 1.	College competitive swimming.
1. A. 2.	College competitive water polo with floating goal course.
1. A. 3.	College competitive water polo with two consecutive wall goal courses.
1. A. 4.	One meter above water springboard diving.
1. A. 5.	Physical education classes.
1. A. 6.	Community pool programs.
1. A. 7.	Community learn-to swim.
1. A. 8.	Community laps swim.
1. A. 9.	Community water aerobics.
1. A. 10.	Two to three programs operating simultaneously.
1. B.	College competitive swimming shall be configured in accordance with the regulations of the National Collegiate Athletic Association's Swimming and Diving Rules book. The competitive swim lanes shall be 164-feet (50 Meters) long and a minimum of 7-feet wide. The lanes shall be constructed 164'-2'' long to allow for an electronic timing touch pad. Competitor style racing platforms shall be provided for the competitive swim lanes. The competitive swim lanes shall have a minimum water depth of 7-feet for safe racing platform dives and fast water courses. The competitive course shall have a minimum of eight competitive lanes with a minimum of two to four simultaneously warm-up lanes.
1. C.	College water polo shall provide both floating goal and wall goal configured courses. The floating goal courses shall run parallel with the long axis of the pool.

	The floating goal courses shall be set up for a minimum 25-yard and 25-meter long courses. If the pool water depths allow a 30-meter long water polo course shall also be provided. The water polo courses shall have a minimum water depth of 6'-6". The wall goal configured water polo courses shall run parallel with the 75' foot width of the pool. A minimum of two wall goal water polo courses shall be able to operate simultaneously.
1. D.	A minimum of one 1-meter diving board shall be provided. The diving stand shall be a Dura-Firm double handrail stand with an adjustable fulcrum. The diving board shall be a 16' long Dura-Flex Maxi-B competitive aluminum board. The diving pool depth of water shall be a minimum 12' feed deep for 1-meter board / platform.
1. E.	Physical education classes shall be supported in both the competitive areas and the shallow water area of the pool. The shallow end of the pool shall have a water depth of 3'-6". The pool shall have a minimum shallow water area of 10' by 75' where the water depth is between 3'-6" to 4'-6". A set of walk-out stairs shall be provided at the shallow end of the pool.
I. F.	Community supported programs shall be supported as the pool size and configuration shall allow.
I. G.	Water temperature: Outdoor Competition Pools: 77 – 82 Degrees Fahrenheit Outdoor Recreational Pools: Maximum of 84 Degrees Fahrenheit Indoor Pools: 2 – 5 Degrees F below ambient air temperature.
1. H.	**Swimming pool deck and auxiliary areas.**
1. H. 1.	The swimming pool deck shall be a natural color concrete with a medium broom finish. A minimum of 10-feet to a preferable 20-foot of deck shall be provided around the pool. The pool deck shall have a 2% slope away from the pool to proper storm drainage. The pool top of deck shall cantilever 12-inches over the deep competition gutter and pool water level.
1. H. 2.	Bleacher areas shall be provided along the long axis and the short axis of the pool. The bleachers shall be moveable aluminum bleachers of up to five tiers.
1. H. 3.	On-deck storage areas shall be provided to accommodate the outdoor storage equipment such as: pool covers and pool cover reels, lane lines and lane line reels, water polo goals, racing platforms, stanchion posts and lifeguard chairs.
1. H. 4.	Area shall be provided for swim meet management. This shall include areas for a scores table, event officials, scoreboard and team gathering areas.
1. H. 5.	A perimeter fence shall be provided for that is compliant with the California Building Code chapter 31B section 3118B.1 and the district standards for campus fence enclosures. Pedestrian gates shall open away from the pool and shall be self-closing and self-latching. Double wide gated shall be provided to allow for the movement of equipment on and off the pool deck.
1. H. 6.	Site lighting shall be provided to allow for night use of the swimming pool. The size lighting shall provide between 20 to 30 foot candles across the pool deck and pool water surface.

1. H. 7.	Indoor storage shall be provided for equipment that cannot be stored outdoors.
1. J.	**Swimming Pool Lighting**
1. J. 1.	Lighting shall be provided at all swimming pools which are to be used at night or do not have sufficient natural lighting to allow all portions of the pool (including the bottom) to be seem without significant glare.
1. J. 2.	Lighting shall be installed to provide uniform distribution of illumination
1. J. 2. a.	**Water Surface lighting:** minimum of 30 foot candles when under water lighting is provided. A minimum of 50 foot candles shall be provided when underwater lighting is not provided.
1. J. 2. b.	**Under water lighting:** When underwater lighting is provided a minimum of 60 lamp lumens per square foot of pool surface should be provided for outdoor pools and 100 lamp lumens per square foot of pool surface for indoor pools.

Division 14 – Conveying Equipment

Section 14 20 00 - ELEVATOR CRITERIA

1.	**Elevator Acceptable Manufacturers:**
1. A.	Acceptable Manufacturers: - KONE Elevators Co. - Mitsubishi Elevator Co. - Otis Elevator Co. - Schindler Elevator Co. - ThyssenKrupp Elevator Co.
1. B.	Finishes to be scratch and vandal resistant. Colors and materials to be approved by the district during the design process.

Per CSI Master Format Divisions 15-20 are Not Used.

Division 21 – Fire Suppression

Section 21 00 00 - FIRE SUPPRESSION

1.	**Fire Suppression System:**
1. A.	Automatic Sprinkler System: **To be Tyco SimplexGrinnell / Johnson Controls**, designed as required by California Building Code. Where buildings or portions of buildings are required by Code to be fire sprinkled, the sprinkler system shall normally be a wet-pipe type system and shall be designed in accordance with all local Codes and Ordinances, and per the requirements of NFPA 13, 14, 20, & 25 (latest edition) for both site water supply and building sprinkler systems. Corridor sprinkler heads shall be recessed.

1. A. 1.	**Acceptable Fire Sprinkler Systems Manufacturers**
1. A. 1. a.	Sprinkler heads shall be Viking, Star, Central, or equal. Heads shall be heavy duty type and installed either exposed or concealed per Architect's design.
1. A. 1. b.	Student toilet rooms shall be provided with concealed flush to ceiling style heads having a painted cover plate, per Architect's design.
1. A. 1. c.	Sprinkler pipes shall be schedule 40 black steel, ASTM A-135 or A-53, with UL approved ductile iron or cast-iron threaded fittings, UL approved grooved fittings and associated couplings may be used. Provide high temperature sprinkler heads at all kiln rooms.
1. A. 1. d.	Schedule 10 UL approved pipe may be used for pipe sizes 3" and larger, with UL approved grooved fittings and associated couplings, except where exposed in gymnasiums.
1. A. 1. e.	Underground site fire piping shall be J.M. Blue Brute Class 200 UL C900 PVC pressure pipe, or ductile cast iron AWWA C111and C151. All pipe and fittings shall be approved for fire protection use.
1. B.	Fire Extinguisher and Cabinets: As required by CBC.
1. B. 1.	Fire Extinguisher Signs to be provided as required per Fire Code. Provide triangle protrusion signs when required, or District approved equal.
1. C.	**Identification of fire suppression piping and equipment**
1. C. 1.	Piping and equipment shall be identified per NFPA 13. This includes, but is not limited to, risers, valves (control, drain, test connections), piping, and fire department connections.
1. D.	**Test and drains**
1. D. 1.	The system shall be designed to be tested during school hours. The discharge from suppression system test valves and drain valves shall be discharged to sanitary sewer system. Discharge shall not terminate to occupied exterior areas.
1. D. 2.	The main drains for the sprinkler system shall be 2" diameter minimum.
1. D. 3.	Coordinate location and flow rate with mechanical/ plumbing engineer for provision of properly sized receptor for drainage.
1. E.	**Clean Agent Fire Extinguishing Systems**
1. E. 1.	Kitchen hood suppression system. NFPA 96, Standard for ventilation control and fire protection of commercial cooking operations, dictates that cooking equipment used in process producing smoke or grease-laden vapors shall be equipped with a compliant exhaust system.
1. E. 2.	Provide system in conformance with current California Mechanical Code, NFPA and applicable state and local codes.
1. E. 3.	Per California Fire Code requirements, kitchen hoods shall have a UL 300 automatic fire exhausting system.

1. E. 4.	Connection to the Fire Alarm.

Division 22 – Plumbing

Section 22 10 00 - WATER DESIGN STANDARDS

1.	**WATER MAINS**
1. A.	Water meters to be connected to energy management system for monitoring.
1. B.	Water mains installed at a slope of 15% or greater shall be designed with restrained joints. Provide adequate drainage measures to protect the trench from erosion.
1. C.	Where grades are 5% or greater, impermeable trench plugs shall be installed. Impermeable trench plugs shall be made of Type II Concrete. Trench plugs shall be located every 50 feet.
2.	**WATER PIPE MATERIALS**
2. A.	Service laterals shall be copper or High Density Polyvinyl (HDPE) SDR 17 per EBMUD Standards.
2. B.	6”-12” water mains shall be High Density Polyvinyl (HDPE) SDR 17 Pressure Class 150, DR18 minimum, per AWWA Standard C900, Ductile Iron Pipe Pressure Class 350 minimum, per AWWA Standard C151, or mortar-lined and machine-applied tape wrapped steel pipe, per ASTM A570, ANSI/AWWA C200, C205, and C214.
2. C.	Asbestos cement pipe shall not be allowed under any circumstances.
2. D.	Orangeburg pipe, or similar shall not be allowed under any circumstances.
2. E.	Corrosion protection shall be provided on all metallic pipes and fittings.
3.	**ALIGNMENT**
3. A.	Horizontal
3. A. 1.	Conform to the State of California Department of Health Services “Criteria for the Separation of Water Main and Sanitary Sewers”.
3. A. 2.	The minimum horizontal separation from storm drains, monuments, gas, electrical, and telephone lines will be 4 feet clear between facilities except at crossings.
3. A. 3.	The minimum clear horizontal separation from a metallic pipeline with an induced current or from an anode field will be 5 feet.
3. A. 4.	All water mains must be designed a minimum of 5 feet from all structures, such as manholes or drop inlets. Provide a minimum of 3 feet from the lip of gutter for service connections and repairs.
3. A. 5.	All water main trenches that are parallel to and deeper than the footing of any adjacent structure must be designed at least forty-five (45) degrees from the footing as required in the Uniform Plumbing Code.
3. A. 6.	Where dual water mains are designed, a minimum 5 feet clear horizontal separation will be maintained.

3. A. 7.	In general, water main crossings over or under other underground facilities will be designed as close as 90° to that facility as possible.
3. B.	Vertical
3. B. 1.	Conform to the State of California Department of Health Services “Criteria for the Separation of Water Main and Sanitary Sewers”.
3. B. 2.	Generally, provide a minimum of 6” of vertical separation from storm drains or other underground utilities such as telephone, cable TV, gas, or electric conduit. When the minimum cannot be maintained, plans will indicate installation of felt expansion material, Styrofoam, or equivalent between facilities. Other measures, such as the use of concrete encasement, controlled density backfill, or ductile iron pipe may be used.
4.	**MAIN SIZING CRITERIA**
4. A.	Water mains must be sized to meet minimum Fire Code requirements in addition to domestic and irrigation demands. Fire protection mains must be sized to meet minimum Fire Code requirements.
4. B.	The maximum flow velocity for new water mains is 10 feet per second.
4. C.	The maximum head loss for new water mains shall be 10 feet per 1,000 feet.
5.	**MAIN / LATERAL COVER**
5. A.	Cover is the distance from the top of the pipe to final finished grade measured directly over the pipe.
5. B.	The minimum standard depth of cover for water mains is 36 inches.
5. C.	Where cover is less than the standard, concrete encasement of the pipe, or Pressure Class 350 Ductile Iron Pipe is required.
6.	**VALVING**
6. A.	A minimum of three (3) mainline valves are required for “T” intersections and four (4) valves are required for cross intersections. A valve may not be required on any leg of a tee or cross intersection if another valve is within 250 feet, except as needed to isolate fire hydrants.
6. B.	All hydrants must be on separate valve-controlled sections of the water main.
6. C.	Resilient-seated Butterfly valves should be used for size 2” to 24”.
6. D.	All gate valves shall be installed in accordance with the latest edition of AWWA standard C509.
7.	**SERVICE LATERALS AND METERS**
7. A.	All water meters are to be provided by the EBMUD and remotely monitoring EMS.

7. B.	Base any required hydraulic calculations for the water meter and service lateral sizes on criteria from AWWA Manual M22. Submit hydraulic calculations to EBMUD for review and approval.
7. C.	All exposed piping at building connections shall be insulated.
7. D.	Irrigation
7. D. 1.	Separate irrigation meters and controllers are to be provided for landscaped areas and remotely monitored by EMS, in accordance with the Model Water Efficient Landscape Ordinance (MWELO) requirements.
7. D. 2.	Landscape and irrigation plans must confirm with the requirements of the Model Water Efficient Landscape Ordinance (MWELO) and be submitted to DSA per PR 15-03, requiring submittal of the DSA form 1-L: Outdoor Water Use Self-Certification of Landscape Irrigation Design and Documentation.
7. D. 3.	Reduced pressure backflow devices shall be provided for all irrigation services. Backflow devices must be specified on the irrigation plan.
8.	**FIRE SYSTEMS**
8. A.	Design plans showing private fire systems must be submitted to the appropriate Fire and/or Building jurisdiction for approval.
8. B.	Generally, the lateral size must be designed the same size or larger than the size required for the fire sprinkler system and/or the private hydrant system. The hydraulic calculations for laterals serving private fire systems will be based on the required fire flow or the fire sprinkler demand, whichever is greater, combined with the peak domestic flow.
8. C.	All private fire systems that only serve onsite hydrants require aboveground single detector check valves. Where aboveground installations are not reasonable due to site constraints, design for single detector check valves in vaults.
8. D.	Double-check detector backflow assemblies are required for:
8. D. 1.	Any property with multiple fire service connections; or
8. D. 2.	Any fire line connections to properties with auxiliary water supply.
8. E.	Reduced-pressure detectors are required for:
8. E. 1.	Any fire line utilizing chemical additives such as antifreeze or fire suppressants;
8. E. 2.	Any building where an extreme hazard exists.
8. F.	The location of any Fire Department connection must be approved by the local Fire Department.
9.	**FIRE HYDRANTS**
9. A.	Design of hydrant locations must meet the Fire Code requirements and be reviewed and approved by the local Fire Department; and all hydrants painted to conform to fire codes.

9. B.	Each hydrant must be on a separate valve-controlled main line sections.
9. C.	Minimum fire flow required at all hydrants:
9. C. 1.	Fire flow as specified in the following subsections is defined as the amount of water available at 20 psi, where that pressure is calculated at the discharge outlet of the flowing hydrant.
9. C. 2.	Fire flow requirements are under the jurisdiction of the Fire Department. The guidelines given above are general. Actual flow requirements must be verified with the local Fire Department prior to submittal of plans.
10.	**PRESSURE**
10. A.	The minimum allowable pressure is 20 psi measured at the fire hydrant. If pressure measured at any faucet is less than 35 psi, a pressure booster system is required.
11.	**SPECIALTY VALVES**
11. A.	Provide air release and vacuum relief valves at high points in the system such as over a hilltop or at the upper end of a dead end main.

Section 22 13 00 - SANITARY SEWER SYSTEM CRITERIA

1.	**SEWER MAINS – GENERAL**
1. A.	Design should conform to the County of Alameda Standard Specifications (ACPWA), the Standard Specifications of Sanitary District No. 1 and the City of Oakland, Alameda, or Berkeley.
1. B.	Lateral connections must be accessible and easy to locate.
2.	**MATERIALS**
2. A.	Gravity sewer laterals shall be High-Density Polyethylene (HDPE) SDR-17 pipe; with a minimum standard diameter ratio (SDR) of 21. Other materials may be used based on site conditions.
2. B.	Use the same pipe material from structure to structure.
2. C.	Asbestos Cement Pipe shall not be allowed under any circumstances.
3.	**ALIGNMENT**
3. A.	Horizontal
3. A. 1.	Conform to the State of California, Department of Health Services, “Criteria for Separation of Water and Sanitary Sewer.”
3. A. 2.	Horizontal separation from storm drains or other sewer mains shall be a minimum of five (5) feet clear between pipes except at crossings.
3. A. 3.	Horizontal separation from other utilities, such as gas, underground electric, underground television cable, etc., shall be a minimum of four (4) feet clear between the pipes except at crossings and provide spacers.

3. A. 4.	Horizontal curves in gravity sewer mains are not allowed.
3. A. 5.	All sewer main trenches that are parallel to and deeper than the footing of any adjacent structure must be at least 45 degrees from the footing as required in the Uniform Plumbing code.
3. B.	Vertical
3. B. 1.	Conform to the State of California, Department of Health Services, "Criteria for Separation of Water and Sanitary Sewer."
3. B. 2.	Provide a minimum of six (6) inches of vertical separation from storm drains or other utilities, such as gas, underground electric, underground television cable, etc. When the minimum cannot be maintained, plans shall indicate installation of felt expansion material or equivalent between facilities. To protect the sewer main from distorting under extreme loads, other measures, such as concrete encasement or ductile iron pipe, may be utilized.
3. B. 3.	Vertical curves in gravity sewer mains are not allowed.
4.	**PIPE SIZING CRITERIA**
4. A.	Design Flow
4. A. 1.	The design flows shall be based on the following criteria:
4. A. 1. a.	The average flow for schools shall be 20 gallons per person per day.
4. A. 1. b.	The average flow shall be increase by a Peak Load Factor of 3.0.
4. A. 1. c.	Sewers that connect to existing sewers shall be designed to carry infiltrated water in addition to the volumes above.
4. B.	Design Velocity
4. B. 1.	Gravity sewers shall maintain a minimum velocity of 2 fps when the pipe is flowing full.
4. B. 2.	For the analysis of existing or proposed sewer systems, use the Manning's Equation.
4. B. 3.	The following Manning's roughness coefficients shall be applied for all design:
4. B. 3. a.	For new pipe: n = 0.012
4. B. 3. b.	For existing pipe: n = 0.014
4. C.	Minimum Pipe Size
4. C. 1.	The minimum sewer pipe size is a 6" diameter.
4. D.	Minimum Pipe Slope
4. D. 1.	The minimum pipe slope for gravity sewers are listed as follows:
4. D. 1. a.	The minimum slope for a 6" sewer is 0.0065.

4. D. 1. b.	The minimum slope for an 8” sewer is 0.0035.
4. D. 1. c.	The minimum slope for a 10” sewer is 0.0025.
4. D. 1. d.	The minimum slope for a 12” sewer is 0.0020.
4. D. 1. e.	The minimum slope for a 15” sewer is 0.0015.
5.	**MAIN / LATERAL COVER**
5. A.	Cover is the distance from the top of the pipe to final finished grade measured directly over the pipe.
5. B.	Minimum cover for all sewer mains and laterals shall be thirty-six (36) inches.
5. C.	Where cover is less than thirty-six (36) inches, special construction techniques must be approved such as concrete encasement, use of ductile iron pipe, concrete cap over the trench or the use of controlled density fill (CDF).
6.	**CONNECTION TO AN EXISTING SEWER MAIN**
6. A.	Connect new mains to existing at existing manholes or by constructing a new manhole over the point of connection.
6. B.	Elevations of mains connecting to existing sewer mains shall be as follows:
6. B. 1.	Side sewer mains connecting to an existing main at an angle of 30 degrees or greater shall be at least 0.1’ higher than existing.
6. B. 2.	Connect sewer mains so that the crown of the smaller main is no lower than the crown of the larger main.
6. C.	Where laterals are the same size as the main, connection must be made with a manhole. Use a Wye for all other lateral connections.
7.	**MANHOLES AND RODDING INLETS**
7. A.	A manhole is required at every horizontal or vertical change in alignment.
7. B.	Maximum distance between manholes is 300 feet.
7. C.	A manhole is required at the end of every main in excess of 200 feet in length.
7. D.	Rodding Inlets may be installed in lieu of manholes at the end of a sewer main where the distance is less than 200 feet to the nearest manhole and the main size is 10” or less.
7. E.	The manhole shall be designed such that the angle in the horizontal plain between the downstream and any incoming sewer is a minimum of 90 degrees.
7. F.	Stubs provided out of manholes for future extensions will have rodding inlets provided when more than one length of pipe is installed or where service laterals are connected to the stub.
7. G.	Private sewer mains must connect to the public main at a manhole.

7. H.	Standard drop manhole installations are required when the difference in elevation between the incoming and outgoing sewer is greater than two (2) feet.
8.	**SEWER LATERALS**
8. A.	The minimum sewer lateral size is four (4) inches.
8. B.	The minimum slope of sewer laterals is 2% or ¼" per foot for four (4) inche laterals.
8. C.	All sewer laterals, from property line or edge of easement to the point of connection with the main line or a manhole, shall generally be perpendicular to the curb alignment or easement and will have and angle of intersection with the downstream section of sewer of no less than 90 degrees. No lateral alignments adverse to the flow of the main will be permitted.
9.	**ABANDONMENT**
9. A.	Any existing sewer mains and service laterals that will not be used shall be abandoned and the following must be noted on the plans:
9. A. 1.	Sewer mains that are to be abandoned shall be securely closed at all pipe ends with a cap or at manholes with a concrete plug. Further, mains twelve (12) inches and larger must be filled with sand slurry or other suitable material.
9. B.	Manholes to be abandoned shall require removal of upper portion (down to three (3) feet from finish grade) and shall be filled with backfill material and compacted to 90 percent relative compaction.

Section 22 14 00 - STORM DRAIN SYSTEM CRITERIA

1.	**GENERAL**
1. A.	In general, all design should conform to the County of Alameda and the City of Oakland, Alameda, or Berkeley Standard Specifications.
1. B.	Storm drainpipe should have a minimum cover greater than two (2) feet.
2.	**MATERIALS**
2. A.	Storm drainpipe materials shall be Ductile Iron Pipe (DIP), Class 52 with approved lining/ coating; High-Density Polyethylene (HDPE) SDR-17 pipe; or Reinforced Concrete Pipe (RCP) with approved lining/ coating; Cast Iron Pipe (CIP) with approved lining/ coating.
2. B.	The same pipe material should be used from structure to structure throughout the site.
3.	**ALIGNMENT**
3. A.	Conform to the State of California Water Resources Control Board "Criteria for the Separation of the Water and Non-Potable Pipelines. See Appendix 'A' in Water Distribution System Design Standards.

3. B.	Horizontal separation from storm drains to sewer mains shall be a minimum of five (5) feet clear between pipes except at crossings.
3. C.	Horizontal separation from other utilities, such as gas, underground electric, underground television cable, etc. shall be a minimum of four (4) feet clear between pipes except at crossing.
3. D.	Provide a minimum of six (6) inches of vertical separation from storm drains or other utilities, such as gas, underground electric, underground television cable, etc.
3. E.	Horizontal and vertical curves in gravity storm drains are not recommended.
4.	**PIPE SIZING CRITERIA**
4. A.	Design Flow
4. A. 1.	Storm Drains shall be designed with the rainfall intensity based on a 10-year storm event.
4. A. 2.	The runoff coefficient "C" shall be defined as follows: The design peak discharge shall be calculated using the Rational Formula as follows: $Q = i \cdot C \cdot A$ where: Q is the design runoff flow rate in cubic feet per second; i is the rainfall intensity in inches per hour; C is the runoff coefficient; A is the drainage area in acres. Description of Surface — Runoff Coefficients Pavement…… 0.70 to 0.95 Roofs…… 0.75 to 0.95 Lawns, sandy soil Flat, 2 percent…… 0.05 to 0.10 Average, 2 to 7 percent…… 0.10 to 0.15 Steep, 7 percent…… 0.15 to 0.20 Lawns, heavy soil Flat, 2 percent…… 0.13 to 0.17 Average, 2 to 7 percent…… 0.18 to 0.22 Steep, 7 percent…… 0.25 to 0.35
4. A. 3.	Minimum slope for all design surfaces is 2%.
4. B.	Design Velocity
4. B. 1.	Storm drainpipes shall maintain a minimum velocity of 3 feet per second when the pipe is flowing full.
4. B. 2.	For the analysis of existing or proposed storm drains, use the Manning's Equation.
4. B. 3.	The following Manning's roughness coefficients shall be applied for all design:
4. B. 3. a.	For new pipe: n = 0.012

4. B. 3. b.	For existing pipe: n = 0.014
4. C.	Minimum Size:
4. C. 1.	Minimum pipe size for all storm drains is 10”.
5.	**MANHOLES**
5. A.	In general, manholes should be located at:
5. A. 1.	All changes of pipe size, type of pipe, and direction
5. A. 2.	Intersections of lines, including inlet runs.
5. A. 3.	A maximum spacing of 300 ft.
6.	**DROP INLET AND CATCH BASIN**
6. A.	All drop inlets and catch basin should conform to the County of Alameda and the City of Oakland, Alameda, or Berkeley Standards and Specifications.
6. B.	Catch basins should be suitable for use with bicycle traffic and high heels in pedestrian traffic areas.
7.	**CURB AND GUTTER**
7. A.	All curbs and gutters should conform to the County of Alameda Standards and the City of Oakland, Alameda, or Berkeley Standard Specifications.
8.	**ABANDONMENT**
8. A.	Any existing storms drains that will not be used shall be abandoned and the following must be noted on the plans:
8. A. 1.	Storm drains that are to be abandoned shall be securely closed at all pipe ends with a cap or at manholes with a concrete plug. Further, pipes 12” and larger must be filled with a sand slurry or other suitable material.
8. B.	Manholes to be abandoned, shall require the removal of the upper portion (down to 3 feet from finish grade) and shall be filled with backfill material and compacted to 90 percent relative compaction.

Section 22 40 00 - PLUMBING CRITERIA AND FIXTRUES

1.	**General Criteria**
1. A.	In the case where an existing fixture is replaced, it shall not generally be equipped differently than it was before, eg. if it was cold water only, it shall generally be replaced with cold water only; if a drinking fountain was non-refrigerated, it shall not be replaced with a refrigerated unit. Refrigerated units are not to be replaced with non-refrigerated units.
1. A. 1.	Coordinate with all disciplines to provide common parallel runs of piping and conduit on the roof using common blocking where possible and code compliant. Do not block accesses.

1. A. 1. a.	When replacing a sink or lavatory, all trim is to be replaced including faucet, supplies, stops, tailpiece, grid drain, and trap. Toto Ltd. or Kohler Co. fixtures or District approved equal.
1. A. 1. a. i.	Existing sink/ lavatory carriers to be re-used where possible. Specify a fixture that is compatible with the new District Standards If it is not possible to specify a fixture compatible with the existing carrier, coordinate with the Architect for wall patch and repair to remove old and install new carrier. In general, space permitting, all toilets and urinals are to be wall hung. All wall-mounted fixtures are to be specified with a carrier. Provide Toto Ltd. or Kohler Co. or District approved equivalent plumbing fittings when repairing or replacement.
1. A. 2.	Domestic hot, hot water return, and cold water piping:
1. A. 2. a.	Piping within the building and above grade shall be Type “L” ASTM B88, hard drawn copper tubing with wrought copper sweat fittings ANSI B16.18 and B16.22.
1. A. 2. b.	Outdoor underground piping in sizes 2-1/2” and 3” shall be Type “L” ASTM B88, hard drawn copper as specified for water piping within the building. Piping 2” and smaller shall be Type “K” ASTM B88, hard drawn copper with wrought copper sweat fittings ANSI B16.18 and B16.22. Piping in sizes 4” and larger shall be schedule 80 CPVC with ring-tight joints. Provide concrete thrust blocks at all underground fittings per manufacturer’s recommendations.
1. A. 2. c.	Piping below the building floor shall be Type “K” soft annealed copper tubing with no fittings below the slab.
1. A. 2. d.	All hot water and hot water return lines shall be insulated to comply with requirements of the California Code of Regulations, Title 24.
1. A. 2. e.	PE Encasement (Below Grade)
2.	**Hot Water Criteria**
2. A.	Where possible provide stand-alone central gas fired water heaters (not tied into heating system or central boiler) sized and located to serve multiple loads within a building. Where not possible, the preference is for small tank electric waters heaters located above in ceiling cavity / attic space or on a shelf. Instantaneous point of use electric water heaters is to be used only in remote, low demand requirement areas. Alternative domestic hot water systems can be reviewed on a case – by – case basis against sustainability standards and building engineers to determine if alternate designs are acceptable.
2. A. 1.	Domestic hot water temperatures shall be 120F storage at the tank and 110F delivery from the fixture.
2. A. 2.	Hot water for kitchens shall be 140F, and for commercial kitchen dishwashers shall be 160F-180F provided by adjacent portable heater, or as required by the dishwasher manufacturer, delivered locally.
2. A. 2. a.	Hot water to kitchen sinks shall be tempered to a maximum temperature of 120F.
2. A. 2. b.	Hot water to kitchen hand washing sinks shall be tempered to a maximum temperature of 110F.

2. A. 3.	Water heaters shall be mounted on four (4) inch concrete housekeeping slab.
2. A. 4.	Provide required seismic bracing on all new and existing to remain water heaters.
2. A. 5.	Domestic hot water circulation pumps:
2. A. 5. a.	Shall meet the requirements of California's lead-free plumbing law, health and safety code 116875 (also known as Assembly Bill AB1963).
2. A. 5. b.	Controls:
2. A. 5. b. i.	Stainless steel shaft provision for on/ off control via EMS.
2. A. 5. b. ii.	Provide aqua-stat and 7-day time clock.
2. B.	**Chilled and Hot Water HVAC Circulating System:**
2. B. 1.	Water treatment systems shall have chemical feeders and initial kits for testing. As systems are renovated, provide Dalphen – chemical free systems, or District approved equal.
2. B. 2.	Confirm "non-water" systems, to eliminate chemicals.
2. B. 3.	Verify closed systems with the District.
2. C.	**Fixtures and Trim:**
2. C. 1.	Water closets:
2. C. 1. a.	Automatic flushing Max usage to be 1.28 gpf
2. C. 1. b.	Flushometer valves Toto Ltd. or Kohler Co. or District approved equivalent. Eco-power Flush and assisted flushing system.
2. C. 1. c.	Floor mounted, vandal proof.
2. C. 2.	Urinals:
2. C. 2. a.	Automatic flushing at existing water-based urinals; use Toto Ltd. or Kohler Co. or District approved equal.
2. C. 2. b.	High-efficiency or washout style urinals using point one two five (0.125) a gallon per flush maximum shall be installed at all new buildings and modernization projects; Toto Ltd. or Kohler Co. or District approved equal.
2. C. 2. c.	Flushometer valves Toto Ltd. No Substitution. Eco-power Flush and assisted flushing system.
2. C. 2. d.	Floor mounted, vandal proof.
2. C. 3.	Lavatories (Acceptable Manufacturers: Toto Ltd. or Kohler Co. or District approved equal):
2. C. 3. a.	Provide floor mounted fixture carriers with arm supports. "Tapered hangers" that lavatories slip onto are unacceptable.
2. C. 3. b.	Vandal-proof fixtures are to be used.

2. C. 4.	Service Sink:
2. C. 4. a.	Floor mounted with hot and cold water in each janitorial room.
2. D.	All fixtures to be equipped with lockshield key stop valves.
2. E.	**Drinking Fountains:**
2. E. 1.	Stainless steel, dual height, ADA, 14 gauge; by Haws or District approved equal.
2. F.	**Faucets:**
2. F. 1.	Student faucets shall be self-closing metering type. Toto Ltd. or Kohler Co. or district approved equivalent with self-sustaining power supply, faucets shall have a 10 second hydro cycle at 0.2 gallons per minute.
2. F. 2.	Lead-free valve and stem construction.
2. F. 3.	Single lever mixing faucets require special care and create maintenance problems, these should be avoided.
2. G.	**Roof/Condensate/Floor Drains:**
2. G. 1.	Floor drains are required at all new, (where permitting at renovation work) Toilet, Shower, Locker, Kitchen, Janitor, Mechanical and any other wet area. Jolsom, Zurn or District approved equal.
2. G. 2.	Roof drains where required at new construction, and where permitting at renovation work roof drains shall be a combination style standard and overflow drain as manufactured by the WATTS Water Technologies Company.
2. H.	**Hose Bibbs - Lockable:**
2. H. 1.	Buildings: In each new and where possible in existing, Toilet Rooms Locker/Shower Rooms, Kitchens and Mechanical Rooms on exterior walls.
2. H. 2.	Grounds: Adjacent to Walkways, Lunch Shelters, and Service Area(s) and raised planters.
2. H. 3.	Roof: Adjacent to roof mounted equipment requiring maintenance. Minimum of (2) hose bibs on a roof.
2. I.	**Pipe and Pipe Fittings:**
2. I. 1.	Steel pipe for any domestic water line and buried piping is prohibited. Buried domestic water line pipe must be Type K or Type L copper piping per state Code.
2. I. 1. a.	Water lines exposed and accessible for replacement:
2. I. 1. a. i.	Circulating HVAC chilled / hot water lines larger than two and one-half (2-1/2) inches, Schedule 40, black steel pipe with malleable iron fittings shall be used.
2. I. 2.	Specify sufficient surge absorbers on water supply lines at fixtures.
2. I. 3.	Verify adequate water pressure(s):

2. I. 3. a.	Provide booster pumps, as required for future demands where existing pressure is not adequate. Specify energy efficient, multi-speed pumps. Review proposed pump with district maintenance.
2. I. 3. b.	Where existing system pressure exceeds 80 psi, provide pressure regulators for systems supply, per code regulations (80 PSI maximum).
2. I. 3. c.	Provide adequate backflow prevention device(s) in all areas to protect the system throughout the campus. Use reduced pressure type.
2. I. 3. d.	Provide “future stubs’ for lawn sprinkler systems with backflow protection. Provide quick couplers for hoses.
2. I. 4.	**Soil and Waste Piping.**
2. I. 4. a.	Piping within the building itself and outside within five feet (5’) of the foundation, shall be no-hub cast iron pipe and fittings, asphaltum coated, free from defects, and shall comply with CISPI. Standard 301-04 or ASTM A-888-04. Fittings shall be made up with “Husky” couplings and shall conform to ASTM C1540 and ASTM C564 except all above ground vent pipe fittings may be made with “Anaco” or “Tyler” stainless steel two band couplings conforming to CISPI Standard 310-04.
2. I. 5.	**Vent Piping**
2. I. 5. a.	Concealed or underground vent piping shall be cast iron pipe and fittings as specified for soil and waste piping.
2. I. 5. b.	Exposed vent piping shall be Schedule 40 galvanized steel pipe, ASTM A53, with black cast iron recessed drainage fittings.
2. I. 5. b. i.	Vents through roof shall have vandal resistant caps to prevent objects from being placed within them.
2. I. 5. b. ii.	Place vents within parapet roofs to appropriate height to vacate odors (fog tends to suppress exhaust within parapet walls and into fresh-air intakes).
2. I. 6.	**Storm Drain Piping:**
2. I. 6. a.	Concealed storm drain piping within the building itself and outside within five feet (5’) of the foundation, shall be no-hub cast iron pipe and fittings, asphaltum coated, free from defects, and shall comply with CISPI Standard 301-00. Fittings shall be made up with “Husky” SD 4000 series or “Clamp All” 125 series stainless steel Type 304 couplings and shall conform to ASTM C 1540 and ASTM C564.
2. I. 6. b.	Exposed storm drain piping shall be Schedule 40 galvanized steel pipe, ASTM A53, with black cast iron recessed drainage fittings. Take care to ensure that piping location does not contribute to ponding, drainage issues, ect.
2. I. 6. c.	Existing storm drain covers should be replaced unless otherwise indicated by the District.
2. I. 7.	Acid Waste and Acid Vent Piping:
2. I. 7. a.	Within the Building: All above slab acid waste and acid vent pipe and fittings including “P” traps, strainer and tailpieces on the acid waste system shall be made

	by the Enfield Industrial Corporation (or equal by R & G Sloane or Orion) of Schedule 40 flame retardant polypropylene and shall be jointed with the Enfield Industrial Corporation "Effusion System" (provide mechanical joint at P-traps only). All flame-retardant polypropylene pipe and fittings shall conform to ASTM D635, UL Test Method Subject 94 and the Enfield Industrial Corporation's Specifications.
2. I. 7. b.	Under Building: Shall be same as specified for within building, except no mechanical joints. Provide stainless steel hangers.
2. I. 8.	Sub-Soil Drainage System:
2. I. 8. a.	Piping: To comply with local codes, SDR-35 PVC perforated pipe with solid wall fittings and solvent-cemented joints. Perforations shall be ¼" diameter on 3" centers, 120 degrees between two rows parallel to pipe axis. Install per pipe manufacturer's directions.
2. I. 8. b.	Filter Wrap: Mirafi N-Series nonwoven polypropylene geotextile. Select exact model 140 or per recommendation of soils report.
2. I. 9.	Indirect Waste Piping:
2. I. 9. a.	Shall be Type "L" copper as specified for water piping.
2. I. 10.	Air Conditioning Condensate Drain Piping.
2. I. 10. a.	Shall be Type "DWV" copper tubing with wrought copper fittings.
2. I. 10. b.	Flexible elastomeric closed cell pipe insulation.
2. I. 11.	General service compressed air and instrumentation systems.
2. I. 11. a.	Above ground: Type L Copper Tube, hard drawn with wrought copper sweat fittings.
2. I. 11. b.	Underground: Type K copper tube, hard drawn with brazed joints and jacketed with 10 mil plastic (minimum).
2. I. 11. c.	Solder: Lead-free, ASTM B32, Grade 95TA, 95-5 wire solder.
2. J.	**Plumbing Systems:**
2. J. 1.	Unique Plumbing Criteria by Space/Function:
2. J. 1. a.	Teacher's Lounge: Provide hospitality sink with garbage disposer. Hot and cold water.
2. J. 1. b.	Science Classrooms: Provide chemistry classrooms with acid resistant piping materials and neutralizing sump as per local code. Biology classrooms shall be equipped with particulate traps (solids interceptors); provide air gas and vacuum outlets as required meeting educational program requirements; furnishing emergency shower / eyewashes as required by code, provide emergency signage. Provide drains for water carry off complete with trap primers. Provide manual emergency shutoffs adjacent to instructor's table or near exit from classroom. Natural gas and other compressed air and vacuum serving science tables shall not be run below floor unless in an accessible trench. Provide inline shut off valves for each gas, air, or vacuum work station faucet.

2. J. 1. c.	Art: Provide clay traps on sinks where pottery materials are used. Provide chemical traps on sinks where art painting materials are used. Incorporate eyewashes where exposure to dyes and chemicals (particularly film development) will be used. Provide special tempering needs where the process demands. Provide interceptors to collect mineral oil and turpentine liquids.
2. J. 1. d.	Gymnasiums: High diversity shall be considered for hot water demands within the shower areas due to the high proportion of students who do not shower following physical education or other activities within the gymnasium. Provide water fountain adjacent to gymnasium.
2. J. 1. e.	Multi-Use: Do not locate plumbing on Multi-Use common walls.
2. J. 1. f.	Toilets – Staff: Provide hose bibb in each room providing the wall/floor covering is water-resistant.
2. J. 1. g.	Toilets – Students: Provide hose bibb and floor drain in each new room where possible in existing.
2. J. 1. h.	Cooking Kitchens: Provide grease interceptors were required by usage and local authority. Furnish water and waste needs of special kitchen equipment, including pressure-reducing valves for dishwashers, etc. Review work with local health department. Provide hand washing sinks and hose bibbs. Sinks and dish washer machines to be served by dedicated hot water lines.
2. J. 1. i.	Warming Kitchens: Provide sink with hot and cold running water. Provide hand washing sinks and hose bibbs.
2. J. 1. j.	Shops: Provide emergency shower / eyewashes as required.
2. K.	**Valves:**
2. K. 1.	Provide ample valves to permit isolation logical portions of piping for repairs or maintenance, without extensive securing of buildings – in addition to:
2. K. 1. a.	Isolation valves at each Building or building wings or sections of large building.
2. K. 1. a. i.	Clearly mark (permanently) shut –off valve.
2. K. 1. a. ii.	Provide proper wrenches.
2. K. 1. a. iii.	Where buried, provide two (2) inch by two (2) inch plug top.
2. K. 1. b.	Isolation at each Toilet Room. For sinks, water closets and urinals. Provide separate valve for separate pipe runs.
2. K. 1. c.	Isolation at each piece of equipment.
2. K. 2.	Provide valves with packed stems on supply to all fixtures.
2. K. 3.	Lubricated plug valves on water service are not permitted.
2. K. 4.	Valves shall be permanently labeled with numbers for identification. Hung tags are unacceptable.

2. K. 5.	Subsurface valves shall be placed within adequately sized valve box for maneuverability.
2. K. 6.	Provide lockable access panel for concealed valves.
2. L.	**Insulation:**
2. L. 1.	To be specified according to equipment and material performance and/or requirements.
2. L. 2.	To meet minimum State of California Title 24 requirements.
2. L. 3.	Pipe insulation shall be provided for the following:
2. L. 3. a.	All water lines that could condensate within the building.
2. L. 3. b.	Domestic old and non-potable in concealed spaces.
2. L. 3. c.	Condensate line min. 1" insulation.
2. L. 3. d.	Domestic hot water and return per Title 24.
2. L. 3. e.	Rainwater leaders within the building – minimum 1/2".
2. L. 4.	Where insulation is accessible to students, wrap in metal jacketing.
2. M.	Acceptable Plumbing Systems Manufacturers:
2. M. 1.	Vitreous China Fixtures: **Toto Ltd.** or **Kohler Co.** or District approved equal.
2. M. 2.	Flushometer valves: **Toto Ltd.** or **Kohler Co**.or District approved equal.
2. M. 3.	Seats: **Toto Ltd.** or **Kohler Co.** or District approved equal.
2. M. 4.	Stainless Steel Sinks: **Elkay, or Just**.
2. M. 5.	Faucets: **Toto Ltd.** or **Kohler Co.** or District approved equal.
2. M. 6.	Lavatory and Sink Drains: **McGuire** - Stainless Steel, or district approved equal.
2. M. 7.	Compression Valves / Angle Stops: **Chicago**, no substitutions allowed.
2. M. 8.	Enameled Cast Iron Service Sinks and Wash Sinks: **American Standard**, or District approved equal.
2. M. 9.	Solid Surface Wash Fountains: **Bradley**, or District approved equal.
2. M. 10.	Trap Primers: **Mifab** or **Zorn**, **Sloan**, or District approved equal.
2. M. 11.	Water Hammer Arrestors: **Watts**, **Zurn**, or District approved equal.
2. M. 12.	Floor Drains and Area Drains: **Zurn**, or District approved equal.
2. M. 13.	Roof Drains and Overflow Drains: **Zurn**, **Watts** or District approved equal.
2. M. 14.	Floor Sinks: **Zurn** - Brass, or District approved equal.
2. M. 15.	Drinking Fountains: **Haws Model 1117L or 1011MS**, dual height, 18 gauge, stainless steel, or approved equal by Sunroc. or District approved equal.

2. M. 16.	Thermal Expansion Tanks: **Wilkins**, **Watts**, or **Amtrol**.
2. M. 17.	Hose Bibbs: **Acorn, Woodford**.
2. M. 18.	Recessed (Lockable) Hose Bibbs: **Acorn**.
2. M. 19.	Gas Pressure Regulators: **Fisher**, **American Meter Company**, or District approved equal.
2. M. 20.	Gas Turrets: **Chicago Faucets**.
2. M. 21.	Natural Gas Control Stations and Emergency Shut-Off:
2. M. 21. a.	Utility Controller: ISIMET, ASCO or District approved equal
2. M. 21. b.	Solenoid Valves: ASCO or District approved equal
2. M. 21. c.	Seismic Gas Shut-Off Valve: California Valve" Gas Control Tech. or District approved equal.
2. M. 22.	Pressure Reducing Valves: **Wilkins, or Watts**.
2. M. 23.	Backflow Preventers: **Wilkins, or Watts**.
2. M. 24.	Electric Instantaneous Type Domestic Heaters: **A.O. Smith, Chromomite, Eemax, or PVI**.
2. M. 25.	Electric Storage Tank Type Domestic Water Heaters: **A.O. Smith, PVI, or Rheem**.
2. M. 26.	Gas Fired Storage Tank Type Domestic Water heaters: **A.O. Smith, PVI, or Rheem**.
2. M. 27.	Emergency Eye Washes, Showers, and Sprays: Bradley, Haws or District approved equal. Shall confirm to the requirements of ANSI Z358.1.
2. M. 28.	Acid Neutralization Tanks: **Enfield**, **Chem-Tainer**, **Labtank**, or District approved equal.
2. M. 29.	Hot Water Circulation Pumps: **Grundfos**.
2. M. 30.	Seven-Day Time Clocks (Time Clock must compensate for changes in daylight savings and leap years): **Paragon**, not to be connected to EMS.
2. M. 31.	Mixing Valves: **Bradley, Powers, Watts, Wilkins.**
2. M. 32.	Pressure and Temperature test wells: **Peterson Engineering Co., Universal Lancaster**
2. M. 33.	Pressure gauge and Thermometers: **Ashcroft, Marsh, Weiss, Trerice, US gauge.**
2. M. 34.	Access Panels:
2. M. 34. a.	Minimum 12"x12".
2. M. 34. b.	Access panels shall have an Allen-head security latch in lieu of a keyed lock.

Division 23 – Heating, Ventilating, and Air Conditioning (HVAC)

Section 23 08 00 - TEMPERATURE CRITERIA

1.	**Indoor Temperature Criteria:**
1. A.	Heated Areas – Occupied: Seventy (70) degrees Fahrenheit dry bulb
1. B.	Heated Areas – Unoccupied: Fifty-five (55) degrees Fahrenheit dry bulb
1. C.	Air-Conditioned Areas: 78°F dry bulb (Not controlled for humidity.)
2.	**Outdoor Temperature Criteria:**
1. A.	Cooling: Ninety-one (91) degrees Fahrenheit, sixty-six (66) degrees Fahrenheit wet bulb
1. B.	Heating: Thirty-Seven (37) degrees Fahrenheit

Section 23 09 00 - INTERNAL LOAD CRITERIA

1.	**Internal Load Criteria:**
1. A.	Heat load shall be calculated based on the following criteria:
1. A. 1.	Occupant Densities: UBC or actual, whichever is higher
1. A. 2.	Lighting: Minimum one and one (1.0) watts/square feet or actual, whichever is lower per Title-24 standard.
1. A. 3.	Equipment: Minimum one (1.0) watts/square feet or actual, whichever is higher. Classrooms shall be sized for 15 power receptacles minimum or per ILET Standards.

Section 23 30 00 - MECHANICAL & HVAC PRODUCTS

1.	**Products:**
1. A.	Acceptable Manufacturers for Heating, Ventilating and Air Conditioning:
1. A. 1.	Whenever possible equipment shall be upsized to minimize unique model numbers within each building / campus.
1. B.	Hot water boilers: **Cleaver-Brooks** or approved equal. Use forced draft burners where necessary.
1. C.	Rooftop packaged heating and ventilating units: **Carrier** or **Trane** no substitutions. Provide with mfr's roof curb and economizer. Units are preferred to be electrical - hydraulic with minimum LEED 90% AFUE.
1. D.	Rooftop packaged electric HVAC units: **Carrier** or **Trane** no substitutions. Provide with mfr's roof curb and economizer. Units are preferred to be electrical - hydraulic with minimum LEED 90% AFUE. Cooling EER/SEER shall be not less than that required by Title 24. The units shall be furnished with minimum MERV 13 filter per latest California Mechanical Code & Title-24 requirements.

1. E.	Air handlers: **Carrier, Trane** or District approved equal. Provide double wall construction, internal insulation, internal fan insulation, VFD's, direct driven fans, pre-filter and final filter, copper/copper coils, and outdoor units with corrosion protection.
1. F.	Indoor furnaces: **Carrier (model 58MVC** or District Approved Efficiency with high efficiency condensing type furnace) or approved equal. Provide with 20 year burner warranty.
1. G.	Outdoor air-cooled condensing units: **Carrier,** or **Trane.** Provide with DX units, and low sound outdoor condensers with low ambient temperature controlled by EMS. Copper coils with corrosion protection.
1. H.	Fans: **Dayton** or **Greenheck**. Provide rooftop type, cabinet type, inline type, or ceiling type as required. Provide mfr's roof curbs, backdraft dampers, birdscreens, etc. as required.
1. I.	Hot water, chilled water, piping above grade: schedule 40 black steel pipe, ASTM A-53 or Seamless Type-S, threaded malleable iron fittings for 2" and smaller, standard weight shall be ANSI A106/A-53 for sizes 2" and larger. Cut or roll grooved type fittings equal to Victaulic may be used for chilled water piping systems. Victaulic is not allowed for hot water system.
1. J.	Insulation: Polyurethane foam either spray applied or high pressure injected with one shot into the annular space between carrier pipe and jacket. Rigid, 90-95% closed cell polyurethane with a 2.0 to 3.0 pounds per cubic foot density and coefficient of thermal conductivity (K-Factor) of 0.14., conform to ASTM C-591. Maximum operating temperature will not exceed 250°F.
1. K.	Refrigeration piping: Type L hard drawn ACR copper tubing with wrought copper fittings. All joints shall be made with Sil-fos-15. Pipe roof penetrations shall not be made via pitch pockets but shall utilize proper means to prevent roof leakage. Insulation to be elastomeric closed cell.
1. L.	Ductwork: galvanized sheet metal, stainless steel sheet metal in wet areas and when handling moist air chemicals. Duct gauges shall be as required by Code, SMACNA Standards, and ASHRAE Standards. Long radius turn and bends shall be used unless the space does not allow.
I. M.	Filtration: provide all heating and ventilating and HVAC equipment with 2" thick, U.L. Class II, 80-90% efficient MERV 13 (or better) pleated media disposable filters, equal to "Camfil Farr" AP-Thirteen or District approved equal.
I. N.	Air distribution devices: diffusers, registers and grilles shall be **Titus**, **Metalair**, **Tuttle & Bailey** or approved equal.
1. O.	Acceptable Manufacturer for Temperature Controls:
1. O. 1.	Delta EMS products.
1. O. 2.	Electric thermostats or sensors with EMS control.
1. O. 3.	Provide EMS controls for boiler on/off control.

1. P.	Acceptable Manufacturers for Mechanical Products:
1. P. 1.	Valves shall be **Stockham**, **Hayward**, or District approved equal. Provide with gate valves, globe valves, ball valves, butterfly valves, plug valves, and check valves.
1. P. 2.	For shutoff duty, ball valves are preferred. For larger sizes, “butterfly” valves are preferred.
1. P. 3.	Calibrated balance valves shall be used for balancing, **Bell and Gossett** “Circuit Setter” or equal.
1. P. 4.	Strainers: by **Armstrong** or District approved equal.
1. P. 5.	Gauges: **Danton**, **Winters** or District approved equal. Whenever possible liquid filled gauges shall be specified.
1. P. 6.	Thermometers: **Weysler**, **Winters** or District approved equal.
1. P. 7.	Access doors: **Milcor, Newman, Nailor,** or District approved equal.
1. P. 8.	Expansion loops: **Metraflex, Metraloop**, or equal.
1. P. 9.	Hydronic Pumps: **Bell and Gossett**, **A.O. Smith**, or District approved equal.
1. P. 10.	Motors: **Baldor**, or **General Electric**. All motors shall be premium efficiency type. Invert duty for VFD driven motors, TEFC motors in outdoor environments, and ODP in indoor locations.
1. P. 11.	Motor starters: **Square D**, or District approved equal, in NEMA enclosure; with phase protection.
1. Q.	Acceptable Manufacturers for Thermal Insulation for Mechanical Systems:
1. Q. 1.	All insulation materials, including jackets, facings, adhesives, coatings, and accessories shall be fire hazard rated and UL listed for a flamespread rating not to exceed 25 and a smoke developed rating not to exceed 50.
1. Q. 2.	Flexible duct connectors shall be by **Durodyne** or District approved equal. Pipe system connectors shall be Metraflex braided Stainless Steel or District Approved equal.
1. Q. 3.	Duct insulation: exterior applications to be rigid fiberglass insulation Interior applications to have flexible elastomeric closed cell installed at the interior of the duct.
1. Q. 3. a.	All duct insulation shall be R-8 or better to comply with Title-24 requirements.

Section 23 31 00 - DUCTWORK AND AIR DISTRIBUTION CRITERIA

1.	**Ductwork and Air Distribution:**
1. A.	Ductwork shall be galvanized steel, fiberglass duct board will not be acceptable. Stainless steel ductwork and air distribution components shall be used in wet areas or when handling moist air or chemicals.

1. B.	Provide access doors in all sections of ductwork that are internally lined, to allow for cleaning of the duct liner and shall be accessible.
1. C.	In general, unless space constraints exist, ductwork exposed in the conditioned space shall be round spiral duct and shall be painted to match adjacent finished surfaces. Insulation is not required for exposed ductwork.
1. D.	Duct systems shall be designed in accordance with ASHRAE and SMACNA standards, and per applicable Codes. Duct systems shall be designed for quiet and efficient system operation. Ducts to be mechanically fastened, not taped together. General dampers and fire dampers are to be of the air foil blade design. Turn blades are also to be of air foil design. Long radius turn and bends are preferred.

Section 23 34 00 - EXHAUST CRITERIA

1.	**Exhaust Criteria:**
1. A	General exhaust air shall move from clean areas to dirty areas with a discharge velocity of no greater than seven hundred (700) FPM.
1. A. 1.	Toilet/Shower Rms: Fifteen- (15) air changes per hour (negative pressure).
1. A. 2.	Locker Rooms: Ten- (10) air changes per hour (negative pressure).
1. A. 3.	Snack Bars/Kitchen: Seven and a half (7.5) CFM/person, Hood exhaust tied to make up air (slightly positive pressure). The number of air changes per hour and air quantities from kitchen hood Type-I will be driven by Food Consultant based on velocity required by California Mechanical Code.
1. A. 4.	Shops: Dedicated exhaust systems for auto exhaust, provide sawdust collector, welding, provide paint booth filters and high exhaust stacks for all exhausts. Sixteen to Twenty (16 - 20) air changes per hour or per provided equipment data sheet.
	Standard Classrooms: (Non-Lab): Exhaust the minimum outside air that is coming into the classroom by general exhaust or returning through the air conditioning unit. The pressurization between classroom and adjacent space should be equal.
1. A. 5.	Science Classrooms: Dedicated exhaust systems to be monitored and volume controlled for fume hoods; Ten (10) CFM/Person outdoor air rate. Sixteen to Twenty (16 – 20) air changes per hour, or equipment data sheet.
1. A. 6.	Art: Ten (10) CFM/Person outdoor air rate. Dedicated exhaust systems for kilns and general room exhaust. Sixteen to Twenty (16 – 20) air changes per hour, or per actual equipment data sheet. The room should be kept negative.
1. A. 7.	Dark Rooms: Sixteen to Twenty (16 – 20) air changes per hour, localized at developing tables if possible, continuous, negative pressure.
1. A. 8.	Mech Rooms: Combustion air louvers (if gas fired equipment are being used), and gravity vents
1. A. 9.	Janitor/Storage: Point fifteen (0.15) cfm/ft^2 or 15 CFM, whichever is higher outdoor air rate. Ten- (10) air changes per hour (negative pressure); specialized exhaust filters and exhaust requirements for hazardous chemicals.

Section 23 36 00 - UNIQUE HVAC CRITERIA BY SPACE/FUNCTION

1.	Unique HVAC Criteria by Space/Function
1. A.	The following noise criteria are the maximum allowed at any location within an enclosed space. The noise criteria shall be measured after installation and with the system fully operational.
1. A. 1.	Administration: Zone by exposure and occupancy. Noise criteria = Noise Coefficient of thirty (30). Minimum one inlet and one outlet per enclosed room. Fully ducted.
1. A. 2.	General Classrooms: Separate zone for each classroom. Noise criteria = Noise Coefficient of thirty (30). Minimum of three (3) supply air outlets, and one return air inlet per room. Use spiral round duct were duct is exposed in the room.
1. A. 3.	Science Classrooms: Separate zone for each classroom. Noise criteria = Noise Coefficient of thirty (30). Fume hood exhaust independent of classroom heating and ventilating system and interlocked with hoods. Hoods will be on whenever the classroom unit is on. General overhead exhaust shall be independent of classroom heating and ventilating system and fume hoods, manually switched for room purge and provided with a pilot light to indicate operation.
1. A. 4.	Art: Separate zone for each classroom, Noise criteria = Noise Coefficient of thirty (30). Provide separate exhaust for kilns, ovens, photo labs/dark rooms; to be centrally monitored. Exhaust shall be dedicated, localized, source capture style where possible. Same supply air and return air outlet criteria as general classroom, except ceramics which shall have separate general room exhaust system.
1. A. 5.	Gymnasiums: Arrange distribution to provide maximum clearance for sports functions inside gymnasium, i.e., volleyball, etc. Distribution shall provide minimum fifty (50) feet per minute (FPM) velocity in all occupied spaces of gym (i.e., bleachers). Noise criteria = Noise Coefficient of forty-five (45).
1. A. 6.	Multi-Use: Zoning by exposure and occupancy. Preferred distribution is by supplying overhead up high at low velocity and returning down low at seating level. Noise criteria = Noise Coefficient of twenty-five (25).
1. A. 7.	Toilets – Staff: Consideration shall be given to heating and cooling with the overhead air distribution system serving adjacent occupied spaces.
1. A. 8.	Toilets – Student: Typically, heat is not provided in student restrooms. Student toilets may be indirectly heated using transfer air from adjacent occupied spaces.
1. A. 9.	Kitchens: Kitchens shall be provided with make-up air systems interlocked with the exhaust hoods. In larger, central kitchens, consideration shall be given to dedicated gas fired make-up air units. Noise criteria = Noise Coefficient of forty (40).
1. A. 10.	Shops: Separate zone for each shop. At high ceilings and more industrial spaces such as auto shop and metal shop, make up air systems shall be provided for large exhaust systems; to be centrally monitored. Noise criteria = Noise Coefficient of forty (40).
1. A. 11.	Cafeteria: Zone by exposure and occupancy. Noise criteria = Noise Coefficient of thirty-five (35).

1. A. 12.	Library / Media Center: Zone by exposure and occupancy. Noise criteria =Noise Coefficient of twenty-five (25).
1. A. 13.	Theaters/Performing Arts: Zoning by exposure and occupancy. Preferred distribution is by supplying overhead up high at low velocity and returning down low at seating level if possible. Noise Criteria = NC 25.

Section 23 37 00 - VENTILATION CRITERIA

1.	**Ventilation Criteria:**
1 A.	The minimum outdoor air supply to all occupied spaces shall be based on ASHRAE Standard 62 and Title 24and the Uniform Building Code (UBC) occupancy criteria or actual. Generally, 15 CFM per occupant in classrooms and 20 CFM per occupant in administrative areas. Fixed minimums shall be set on most systems except those serving high occupancy spaces like classrooms, gymnasiums and multipurpose areas which shall be equipped with CO2 sensing controls. Set CO2 levels at ASHRAE Std. 62 levels or better. All of dampers shall close when unit shuts down. All units shall be capable of introducing 100% outdoor air. Locker rooms shall be provided with a minimum of One-half (.5) CFM/SF outside air to comply with ASHRAE Std. 62.
1. B.	The minimum supply air circulation rates shall be:
1. B. 1.	One-half (.5) CFM/SF for the following areas: Corridors and Storage Rooms NOT SUPPLYING IN THESE AREAS.
1. B. 2.	One (1.0) CFM/SF for the following areas: Offices, Library/Media Centers, Shops, Gymnasiums, Locker/Shower Rooms, Theaters and Kitchens
1. B. 3.	One and one-half (1.5) CFM/SF for Classrooms, Computer Labs, Multi-Use & Lecture Rooms.

Section 23 50 00 - HVAC SYSTEM CRITERIA

1.	**Heating, Ventilating and Air Conditioning Systems General Notes:**
1. A.	HVAC Systems:
1. A. 1.	In general, heating and ventilating only shall be provided. HVAC with refrigerated air conditioning is required in Computer Lab Classrooms and MDF/IDF Data Rooms only. Normally a separate unit is provided to condition the space unless approved by the District.
1. A. 2.	For all modernization projects, the Engineer shall evaluate the existing HV or HVAC systems and provide an assessment report with findings and recommendations for replacement to the District.
1. A. 3.	The Architect's proposed replacement system type shall be based on considerations of energy efficiency, life cycle cost, and the District's maintenance capabilities along with the systems impact to building architecture, the impact to roof structure, the potential re-use of the existing ductwork, etc. Existing hydronic

	heating and ventilating system in good condition may be re-used or replaced with a like system where appropriate and as approved by the District.
1. A. 4.	Systems Coordination: Engineer shall provide a coordination drawing showing all mechanical equipment demonstrating clearances required for regular maintenance.
1. A. 5.	HEATING & VENTING SYSTEMS: Shall be gas-fired central furnaces generally be located in indoor mechanical rooms or acoustically insulated furnace closets. Provide adequate (and Code-required) service clearance and removal provisions shall be made.
1. A. 6.	Systems shall be properly zoned according to exposure and occupancy usage. All spaces to be designed for code required air balancing, per latest CALGreen requirements.
1. A. 7.	Airside economizers shall be provided for each system 1600 CFM or greater in size.
1. A. 8.	Gas-fired furnaces shall be the high efficiency “condensing” type.
1. A. 9.	High efficiency type motors shall be specified for all heating, venting, and, where applicable air conditioning equipment and exhaust fans.
1. A. 10.	Areas such as Auto Shops which have large roll-up doors which are often open shall avoid forced air heating systems. Provide gas-fired radiant tube type heating systems in lieu of forced air heating.
1. A. 11.	The District shall be consulted regarding locations of air-cooled condensing units to determine the most suitable location (on roof or on grade) to prevent vandalism.
1. A. 12.	Installation of new ductwork, piping, and temperature controls conduit in existing buildings shall be closely coordinated with the existing structure, ceilings, light fixtures, smoke detectors, classroom clocks, etc. to insure that no conflicts occur during construction. Detailed field investigation work will be required by the Architect and Engineer to insure a trouble free installation.
1. B.	If existing ductwork is to be reused, the Architect and Engineer shall consult with the District on whether or not to specify internal duct cleaning and sanitizing as part of the modernization project. If ductwork is to be cleaned, determine location and number of ceiling and manufactured duct access panels and show them on the bid documents.
1. B. 1.	Inspect and where deteriorated, provide new roof curbs whenever rooftop equipment is replaced and the building is re-roofed.
1. B. 2.	Routing of new ductwork shall be coordinated with all existing building services to remain such as; lighting, security systems, fire detection and alarm.
1. B. 3.	All mechanical systems shall comply with or exceed current Title 24 energy standards.
1. B. 4.	Duct mounted smoke detectors required for compliance with CMC 608 unit shut down – Coordinate with the Electrical Engineer to have Specified smoke detectors be self powered, contain 2 dry contacts and have conduit and wire routed from the smoke detector back to site main fire alarm panel. The Districts independent

	contractor will make the final connection between the smoke detector, wiring and fire alarm panel.
1. B. 5.	In all occupied spaces, wherever possible, new utility services for mechanical equipment shall be concealed within furred spaces or chases.
1. B. 6.	Locate equipment to facilitate ease of maintenance, repair and replacement. Equipment shall not be located where it is necessary to remove portions of roofs, walls, partitions or ceilings to effect replacement, repair or adjustment, ideally.
1. B. 7.	Switches for mechanical equipment shall be located in such a position as to avoid unauthorized access. Switches should not be located behind cabinets, shelving, equipment, etc.
1. B. 8.	Provide four (4) feet minimum clearance surrounding equipment for maintenance. (Additional space requirements of the manufacturer/installer shall supersede the minimum, when access to internal parts and replacements are necessary.
1. B. 9.	The Architect will be responsible for specifying combustion air louvers & sizes on the architectural drawings, including those located indoors. Mechanical Engineer shall size the louvers and coordinate with Architect for the locations.
1. B. 10.	Two inch pleated with 2" thick, U.L. Class II, MERV 13 efficiency pleated media disposable filters equal to "Farr" 40/40 or district approved equal. Filter racks shall be specified for easy replacement on HVAC equipment. Unit ventilators and fan coils may be specified with one inch pleated disposable filters. All filter banks to have recording magnahelics.
1. B. 11.	Ventilation louvers shall be heavy gauge, galvanized finish, prepared for paint. Specify twelve/fourteen (12-14) gauge material for exterior use and sixteen- (16) gauge material for interior use. Provide rain resistant drainable blades on exterior intake louvers; i.e.: Ruskin or District approved equal.
1. B. 12.	Cap all vents at exterior roof penetrations. Use twelve (12) gauge galvanized screen material to prevent vandalism or animal access.
1. B. 13.	Verify compliance with the Industrial Accident Commission Regulations on exit requirements for Mechanical Rooms, access to roof mounted equipment, and posting of emergency instructions.
1. B. 14.	Mechanical requirements shall be coordinated with structural engineer for framing details for passage of ventilating ducts, vents, etc and so indicated on the construction documents. Verify shear walls are not penetrated.
1. B. 15.	Specifications shall require "accurate" As-Built record drawings. Operation and maintenance manuals and complete schematic drawings of control system to be included in frame with glass or plastic cover. Final payments will not be made until these drawings are received by the District.
1. B. 16.	Each piece of equipment shall be permanently identified with an attached engraved bakelite plate.
1. B. 17.	Install tracer wires for all non-metallic underground piping outside of buildings.

1. B. 18.	Piping systems shall be permanently marked with stencil (Setmark or equal) for utility type and flow direction. (Decals will not be acceptable.)
1. B. 19.	Instructions and Training of District personnel by manufacturer representatives will be mandatory for specialized equipment and controls.
1. B. 20.	Specifications shall include extended warranty covering labor and materials on mechanical equipment.
1. B. 21.	Closed loop ground heat exchanger piping: high density polyethylene PE-3408 per Architect's design.

Per CSI Master Format Divisions 24 is Not Used.

Division 25 – Integrated Automation: The District has not standardized this section.

Section 25 30 00 - ENERGY MANAGEMENT CONTROL SYSTEM (EMCS) CRITERIA

1.	**Energy Management Control System (EMCS) Criteria:**
1. A.	Energy management control systems shall utilize simple electric controls. A centralized DDC campus or District wide system will be employed by Delta Systems and **compatible with the BACnet protocol**.
1. B.	Individual room units shall be controlled by thermostats. Each classroom shall be provided with individual temperature control.
1. C.	Central systems serving multiple occupancies such as hot water boilers shall be controlled by EMS. Boilers shall be provided with operation lockout and supply water temperature reset based on outside air temperature programmed by the EMS. Provide night setback temperature control on boilers; with ultimate on / off feature.
1. D.	PCCD Maintenance department shall control room space temperature adjustment. Thermostats shall be installed in ventilated locked enclosures.
1. E.	Existing pneumatic controls shall be replaced with new electric controls where the existing system is modernized or replaced. New pneumatic controls shall not be installed.

Division 26 – Electrical

Section 26 01 00 - GENERAL ELECTRICAL CRITERIA

1.	**General**
1.A	1. Applicable Codes and Standards: a. California Code (CC) b. California Building Code (CBC) c. California Electrical Code (CEC) d. California Fire Code (CFC) 2. California Energy Commission (latest Title 24 Energy Efficiency Standards for Non-Residential Buildings.

	3. National Fire Protection Association (NFPA) a. NFPA 70 National Electrical Code (NEC) b. NFPA 72 National Fire Code c. NFPA 101 Life Safety Code. 4. American National Standards Institute (ANSI) Publications: a. C2-02 National Electrical Safety Code. 5. Code of Federal Regulations (CFR): a. 29 CFR 1910.147 Control of Hazardous Energy (Lock Out/Tag Out). 6. Electronics Industries Association (EIA). 7. Institute of Electrical and Electronics Engineers (IEEE). 8. National Electrical Testing Association (NETA): a. Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems, Standard ATS. 9. National Electrical Manufacturers Association (NEMA). 10. Underwriters Laboratories – (U.L.) 11. California Title 8, Chapter 4 California Occupational Safety and Health Act. (COSHA) Standards. 12. State of California Public Utilities Commission: a. General Order 128 Rules for Construction of Underground Electric Supply and Communication Systems. 13. All other applicable Federal, state and local laws and regulations.
1.A.1	Code compliance is mandatory. Nothing in these standards permits work to not conforming to these codes. Where work is shown to exceed minimum code requirements, comply with the outlined standards.
1.A.2	The design, manufacture and testing of electrical equipment and materials shall conform to or exceed latest applicable National Electrical Manufacturers Association (NEMA), Institute of Electrical and Electronics Engineers (IEEE) and American National Standards Institute (ANSI) standards.
1.A.3	All materials shall be new and bear Underwriters' Laboratories, Inc. (UL) label. Materials that are not covered by UL testing standards shall be tested and accepted by an independent testing laboratory or a governmental agency, which laboratory shall be acceptable to the University's Representative and code enforcing authority.
1.A.4	No work shall be concealed until after it is inspected and approved by the proper authorities. If work is concealed without inspection and approval, the Contractor shall be responsible for all work required to open any concealed areas, and to restore them to their pre-construction condition in addition to all required modifications.
1. B.	Provide spare empty conduits for incoming power, telephone and cable television services from utility companies where new services are required.
1. C.	Site infrastructure to facilitate distribution between campus buildings for new power, communication, informational technologies, fire alarm, security, clock/PA, and temperature control systems.

1. D.	Upgrade of electrical service capacities to accommodate new technologies, consolidation of utility service connections and meters, and replace of deteriorating power distribution equipment and feeders.
1. E.	Building grounding for new power distribution and telecommunication systems equipment.
1. F.	Upgrade of interior and exterior lighting systems for a more energy efficient installation, improvement in lighting quality, replacement of damaged fixtures, and consolidation of lamp type for ease in maintenance.
1. G.	New lighting control systems to be connected to EMS; take advantage of current technologies in automatic controls and to conform to Title 24 - Energy Code.
1. H.	Improvement in egress lighting system for compliance to code.
1. I.	Branch circuiting to accommodate new lighting system.
1. J.	Power wiring and service connections to new HVAC and plumbing equipment.
1. K.	Power service and fire alarm system control interface for new elevator equipment.
1. L.	Additional wiring devices and branch circuit distribution within classrooms and equipment rooms to support new computers and technology equipment.
1. M.	Replacement of telephone system cabling from MPOE/MDF to IDF's and from IDF's to instruments. Multi-pair voice cable distribution shall be provided as part of site infrastructure to each campus building and terminated at IDF's. Station cabling shall be distributed to the individual handsets within building. For modernization projects replace all copper telephone cable. See PCCD – IT Department Datacom Infrastructure Standards.
1. N.	New clock/PA headend system with class scheduling function and audible annunciation shall be provided at MDF headend location. Cabling shall be installed throughout the site infrastructure to each building and distributed to new combination clock/speaker assemblies and/or existing 70V speaker and new clock assemblies at classrooms, assembly areas, locker rooms, gyms, administration office, etc. New and/or existing 70V exterior weatherproof speaker assemblies shall be installed on the exterior of the buildings. PCCD – IT Department Datacom Infrastructure Standards.
1. O.	New data cabling system to include fiber optic cable for site infrastructure distribution from the MDF to the individual IDF's at each campus building and CAT6e station cables from the IDF's to each station drop. ILET standard provides for eight (8) data drops per classroom with additional drops in administration offices, teacher prep rooms, counters and work areas. With the new horizontal voice cabling called for elsewhere herein, this is a total of nine (9) Cat6e drops per standard classroom. See District's Interactive learning Environment Technology Standards and PCCD – IT Department Datacom Infrastructure Standards.
1. P.	CATV cable distribution system shall be provided from the MPOE room to each of the IDF's via the site infrastructure. Two cable drops shall be provided to each classroom from the IDF locations.

1. Q.	Provisions shall be made for future video projection within each classroom to include power and pre-wiring for system.
1. R.	New security monitoring, alarm and keypad access control system shall be provided throughout the campus for access and disarming alarms.

Section 26 05 00 - BASIC ELECTRICAL MATERIALS AND METHODS

1.	**Basic Electrical Materials and Methods:**
1. A.	System includes:
1. A. 1.	Raceways.
1. A. 2.	Wires and cables.
1. A. 3.	Wiring devices.
1. A. 4.	Grouting and bonding.
1. B.	Components: Raceways:
1. B. 1	Rigid steel conduit (GRS): Shall be used for feeders and branch circuits run exposed on roof, where necessary to service mechanical equipment.
1. B. 2.	Electrical metallic tubing (EMT): Shall be used for electrical feeders, interior power and lighting branch circuits and low tension (telephone and signal) distribution system where run concealed above suspended ceilings, in concrete slabs, not in contact with earth, in stud walls, furred spaces, and crawl spaces.
1. B. 3.	Rigid non-metallic conduit (PVC): Shall be used for any of the following:
1. B. 3. a.	For site distribution infrastructure of power, communications, and all other signal systems, run underground in common trench.
1. B. 3. b.	For exterior branch circuits in planters and directly buried in earth, 36" minimum below grade.
1. B. 3. c.	Electrical service entrance conduits and telephone service entrance conduits may be direct burial PVC conduit, 36 inches minimum below grade.
1. B. 4.	Flexible metallic conduit (FMC): Shall be used in dry locations for connections from adjacent outlet boxes to motors, transformers, vibrating equipment and machinery and to lighting fixtures installed in suspended ceilings, minimum sizes shall be 3/8" for lighting fixtures and control wiring and 1/2" for motor and transformer connections. Maximum length is 6 feet. Maximum whip is 25 feet.
1. B. 5.	Liquid resistant flexible metallic conduit (LFMC): Shall be used in damp and wet locations for the same applications as for FMC specified under this Section. Connections to all pump motors, solenoid valves, float switches, flow switches and similar devices shall be made using liquid resistant flexible metallic conduit. Minimum sizes shall be 3/8" for lighting fixtures and control wiring and 1/2" for motor and transformer connections. Maximum length is 6 feet.

1. B. 6.	Surface raceway:
1. B. 6. a.	Classroom interior wiring distribution to use three compartment surface raceway above or alternatively, two compartment non-metallic wire mold 5400 or equal by Hubbell.
1. B. 6. b.	Surface non-metallic raceways shall be installed in classroom applications where concealment of conduit is not possible to facilitate connections to new wiring devices, computer data outlet, CATV outlets, etc.
1. B. 6. c.	In applications where service to single electrical devices or surface lighting fixtures is required, provide single-compartment surface metal raceway with associated surface boxes and components, Wiremold #V500 series or equal. At communications devices connected with Category rated cabling, provide small diameter surface raceway with integral 1" min radius corner fittings (Panduit LDP-10, Hubbell MediaTrak MT7), with plates mounted on flush old work boxes and cabling fished through wall to adjacent surface raceway runs. At non-demising (non-party) walls, where sound isolation is not a criterion, alternately place low voltage using cut-in rings in lieu of old work boxes is acceptable.
1. B. 6. a.	Classroom interior wiring distribution to use Three-compartment surface raceway non-metallic Wiremold 5500 or equal by Hubbell, two compartment non-metallic Wiremold 5400 or equal by Hubbell.
1. B. 6. d.	Size new communications pathways for 30% fill based on maximum station cabling diameters accepted for the Project.
1. B. 7.	Cable tray:
1. B. 7. a.	Cable tray shall be ladder type, furnish complete to include tray, cover, accessories, fittings and supports as required. Cable tray shall be NEMA VE 1.
1. B. 7. b.	Low voltage cable tray in above ceiling spaces at IDFs and MDF to be constructed of chrome wire mesh equivalent to GS Metals, B-Line or Cablofil. Size for 30% fill with initial installation.
1. B. 7. c.	Trays shall be utilized in MPOE, MDF rooms and IDF closets.
1. C.	Wire and cable:
1. C. 1.	Metal-clad cable (MC):
1. C. 1. a.	MC cable shall be an armored assembly of two or more dual rated THHN/THWN conductors and a full sized green insulated ground wire. Cable sheath shall be fabricated in continuous lengths from galvanized steel strip, spirally wound and formed to provide an interlocking design. Connectors shall be of the single screw clamp variety with steel or cast malleable iron bodies and threaded male hubs with insulated throats. Fittings shall be UL listed for use with MC cable type specified.
1. C. 1. b.	MC cable may NOT be used for branch circuit homeruns or feeders; provide conduit and wire homeruns and feeders. The intent of the term "concealed" refers to areas not visible or subject to physical damage and includes accessible ceilings and non-

	accessible walls. The intent of the term “final branch runs” refers to those runs of MC cable that create the last l(or final) branch of the “tree” created by the electrical wiring system.
1. C. 1. c.	MC cable may NOT be used in accessible (during construction) walls so as to allow easier pulling of new cabling should it be required in the future. EMT shall be used in all readily accessible walls (those accessible during construction) for this purpose. In inaccessible walls, MC cable or flex conduit may be used.
1. D.	Wiring devices:
1. D. 1.	Receptacles: 20 amp, 125 volt, duplex, grounding type, specification grade, convenience outlets. Receptacles shall be color as selected by Architect. Provide 20 amp GFCI receptacles in bathrooms, pools, kitchens, and exterior locations where required by code.
1. D. 2.	Switches: 20 amp, 125/277 volt, quiet type specification grade. Switches shall be color as selected by Architect. Provide lighting in all machine rooms and IT closets.
1. D. 3.	Cover plates shall be nylon, or heavy duty throughout with color as selected by Architect.
1. E.	Grounding:
1. E. 1.	System description:
1. E. 1. a.	Provide for the grounding and bonding of all electrical and communication apparatus, machinery, appliances, building components, fittings and accessories where required to provide permanent, continuous, low impedance, grounded electrical system.
1. E. 1. b.	Ground the electrical service system neutral at service entrance equipment.
1. E. 1. c.	The complete electrical installation including the neutral conductor, metallic conduits and raceways, boxes, cabinets and equipment shall be completely and effectively grounded in accordance with all code requirements.
1. E. 1. d.	Provide ground for service to all telecommunication and computer distribution equipment in MPOE, MDF and IDF rooms. Terminate at telecommunications ground buss bar (B-Line, CPI, Newton or equivalent) or comparable panel board lug ground attached to backboard.

Section 26 05 19 - TELECOMMUNICATIONS BUILDING INFRASTRUCTURE SYSTEM

1.	**Telecommunications Infrastructure System:**
1. A.	System includes:
1. A. 1.	Complete conduit raceway system for power, communication, informational technology, fire alarm, security, clock/PA, A/V and EMS. Raceways shall inter-connect campus building and/or systems with headend and service equipment to facilitate the installation of systems cabling.

1. A. 2.	Pull boxes as required to facilitate cable installation and as required by code. Mark pull boxes for system served.
1. A. 3.	MPOE/MDF rooms and IDF closet fit-out.
1. B.	Raceway requirements:
1. B. 1.	Coordinate underground incoming service conduits with utility companies from property line to interface with main service equipment or termination points. Comply with their requirements for service entrance installations.
1. B. 2.	Inter-connect power distribution system conduits from main service switchboard to remote distribution equipment per the power single line diagram. Refer to feeder schedule for conduit sizes and quantities. Provide pull boxes to facilitate cable installations and redirection of conduit duct banks.
1. B. 3.	For all signal system conduits installed as part of the infrastructure, provide minimum 4" conduits with pull boxes as required. Include at least four 4" spare conduits as part of the main trunk installation for future use and include two 4" spare into each building.
1. B. 4.	Signal system conduits shall Inter-connect the MPOE/MDF facility on campus with each of the IDF closets.
1. C.	MPOE/MDF and IDF equipment rooms:
1. C. 1.	In each room provide 4' x 8' x ¾" thick fire treated plywood backboards wrapping around entire room. For Telephone room only.
1. C. 2.	Grounding requirements:
1. C. 2. a.	Provide main telecommunication ground bus wall mounted in MDF with a #6 THHN ground conductor in ¾" conduit to main building referenced ground bus.
1. C. 2. b.	In each of the IDF's provide a wall mounted ground bus with a #6 THHN ground conductor in ¾" conduit to main building referenced ground bus or to building steel.
1. C. 3.	Power requirements:
I. C. 3. a.	In MPOE/MDF room provide three double duplex convenience receptacles on each wall with a dedicated 20 amp, 120 volt circuit connection for every two double duplex devices.
I. C. 3. b.	In IDF rooms provide one double duplex convenience receptacle on each wall with a dedicated 20 amp, 120 volt circuit connection for every two double duplex devices.
I. C. 3. c.	Refer to the rack descriptions herein for the power requirements at communications racks.
I. C. 4.	Cable Tray:
I. C. 4. a.	Ladder type cable tray:
I. C. 4. a. i.	MDF/MPOE shall have 24" x 6" deep cable tray.

I. C. 4. a. ii.	IDF shall have 12” x 6” deep cable tray.

Section 26 10 00 – ELECTRICAL DISTRIBUTION SYSTEM

1.	**Electrical Distribution:**
1. A.	Maintain code required working clearances of all new switchgear equipment installations for ease in maintenance, repairs, and replacement.
1. B.	Provide adequate power distribution and provisions for temporary housing during the construction phases as well as all planned future construction or temporary classrooms.
1. C.	Wherever possible the following should apply:
1. C. 1.	277/480 volt, 3-phase, 4 wire: Incoming service.
1. C. 2.	480 volt, 3-phase, 3 wire: Large loads and motors ¾ horsepower and greater. 4 wire for computer service applications (UPS) RTC.
1. C. 3.	277 volt, 1-phase, 2 wire: Lighting branch circuiting and small motor loads.
1. C. 4.	120/208 volt, 3-phase, 4 wire: Incoming service when the above is not available or feasible.
1. C. 5.	208 volt, 3-phase, 3 wire: Miscellaneous equipment loads.
1. C. 6.	120 volt, 1-phase, 2 wire: Wiring device loads and miscellaneous equipment.

Section 26 13 00 – POWER DISTRIBUTION SWITCHGEAR SYSTEM

1.	**Power Distribution Switchgear:**
1. A.	System includes:
1. A. 1.	Main service switchboard and distribution switchboards, including accessories.
1. A. 2.	Disconnect switches.
1. A. 3.	Dry type ventilated transformers. Wet (non-PCB) for large transformers, with H.E. high efficiency.
1. A. 4.	Panel boards.
1. A. 5.	Over current protection devices.
1. B.	Components:
1. B. 1.	Switchboards:
1. B. 1. A.	Termination section for incoming service conductors.
1. B. 1. B.	Provisions for installation of CT’s and meter by Utility Company.
1. B. 1. C.	Main and feeder circuit breakers. Provide zone interlock system for breakers with ground fault relays.

1. B. 1. D.	Digital metering unit and transient voltage surge suppressors to connect to switchgear.
1. B. 1. E	Copper bus, braced and rated to withstand the available fault current.
1. B. 1. F	NEMA 1 for indoor use, NEMA 2 wet and machine room locations and NEMA 3R for outdoor use.
1. B. 2.	Distribution boards:
1. B. 2. A.	Bolt-on molded case circuit boards.
1. B. 2. B.	Copper bus bars.
1. B. 2. C.	NEMA 1 for indoor use and NEMA 3R for outdoor use.
1. B. 2. D.	Distribution boards shall be braced and rated to withstand the calculated interrupting capacity.
1. B. 3.	Disconnect switches: Disconnect switches shall be NEMA heavy duty type switch with dead front construction, 240 or 600 VAC rated as applicable, with NEMA 1 enclosure for indoor use and NEMA 3R enclosure for outdoor use. NEMA 2 wet and machine room locations.
1. B. 4.	Dry type step-down transformers: H.E. efficiency Indoor main transformer.
1. B. 4. A.	Three phase ventilated type.
1. B. 4. B.	Floor, wall or ceiling mounted, 150-degree C. insulated class; 480 volt delta primary; 120/208 volt, 3 phase, 4 wire, wye secondary.
1. B. 4. C.	Units shall be K20 rated (K factor rating for service to non-linear loads).
1. B. 5.	Panel boards:
1. B. 5. A.	Bolt-on molded case circuit breakers.
1. B. 5. B.	Copper bus and ground bus.
1. B. 5. C.	Door-in-door construction with hinged panels.
1. B. 5. D.	150% neutral bus for 120/208 volt panels served by K rated transformers.
1. B. 5. E.	Transient voltage surge suppressors (heavy duty) TVSS on 120/208 volt panels.
1. B. 6.	Circuit breakers for branch circuit panel boards:
1. B. 6. A.	Shall be molded case, bolt on, trip indicating, and thermal magnetic type ambient temperature compensated.
1. B. 6. B.	Breakers shall have toggle, quick make and quick break operating mechanisms with trip-free feature to prevent contacts being held closed against over current conditions in the circuit.
1. B. 6. C.	Main computer room breakers to have connection to EMS system that allows for monitoring of power status.

Section 26 27 26 – WIRING DEVICES & MISCELLANEOUS REQUIREMENTS:

1.	**Additional Miscellaneous Requirements:**
1. A.	Device branch circuiting:
1. A. 1.	A maximum of five (5) duplex convenience receptacles shall be connected to a 20 amp, 120-volt circuit for branch circuiting.
1. A. 2.	Provide a dedicated 20 amp, 120-volt circuit where required by equipment load.
1. B.	Provide duplex receptacles and branch circuiting as follows:
1. B. 1.	**Classrooms:**
1. B. 1. a.	8 duplex receptacles for computers.
1. B. 1. b.	2 duplex receptacles for teacher station
1. B. 1. c.	2 duplex receptacles for TV monitors.
1. B. 1. d.	1 duplex receptacle for video projection.
1. B. 2.	**Computer lab classrooms:**
1. B. 2. a.	number of duplex receptacles for computers and monitors to match floor plan density.
1. B. 2. b.	6 duplex receptacles for peripheral equipment
1. B. 2. c.	2 duplex receptacles for teacher station
1. B. 2. d.	2 duplex receptacles for TV monitors.
1. B. 2. e.	1 duplex receptacle for video projection.
1. B. 3.	**Elevator machine rooms:**
1. B. 3. a.	4 duplex receptacles for peripheral / interim equipment.
1. C.	In science labs provide a 120-volt circuit for solenoid valve controlling gas line into room and tie into switch near teacher's desk for emergency cut-off of gas in room.
1. D.	Miscellaneous elevator requirements:
1. D. 1.	In the pit of each elevator provide the following:
1. D. 1. a.	One GFCI duplex receptacle.
1. D. 1. b.	One wall mounted, compact fluorescent, vapor tight lighting fixture with glass globe and cast aluminum housing/guard and one compact fluorescent lamp.
1. D. 1. c.	One single pole, single throw toggle switch for control of lighting fixture.
1. D. 1. d.	Provide a dedicated 20 amp, 120 volt emergency circuit feed to each elevator pit for service to above.
1. D. 2.	Provide a dedicated 20 amp, 120 volt circuit to each elevator for sump pump if

	needed, at elevator equipment rooms and terminate at disconnect adjacent to entry door for elevator cab lights and fan. Service shall be from an emergency power source.
1. D. 3.	Elevator Interface: Provide fire alarm system control module and wiring to controller for elevator recall upon activation of elevator lobby smoke detector.
1. D. 4.	Provide voice drop for interface to elevator telephone. Provide low voltage for outlet for security cameras at the discretion of the District.
1. E.	Emergency generator interface:
1. E. 1.	Where requested by the District, make provisions at the exterior of a building for a plug-in hook-up of a portable emergency generator. Generally, the buildings will be administration, gyms or multipurpose and will be utilized for extended power outages. The provision shall include the following.
1. E. 1. a.	Weatherproof plug connector on exterior of building adjacent to service point where a portable generator could be located. Size of plug shall be as directed by the District.
1. E. 1. b.	Include feeder to main distribution board for that particular building and terminate it on an input circuit breaker. Interlock generator breaker with the main breaker in the distribution board utilizing kirk-keyed switches, such that breakers break-before-make and the two cannot close on each other. Feeder and breaker shall be sized to carry the generator capacity, or auto transfer switch.
1. F.	Record “As-Built” documentation:
1. F. 1.	Drawings shall fully represent installed conditions including actual locations of outlets, true panel board connections following phase balancing routines, correct conduit and wire sizing as well as routing, revised fixture schedule listing manufacturers and products actually installed, and revised panel schedules. Contractor shall record all changes in the work during the course of construction.
1. F. 2.	Record drawings shall be the transfer of recorded information to the construction documents via computer aided drafting (CAD) process. A set of CAD files of the electrical documents will be provided to the contractor in Autodesk Revit BIM CAD standard.
1. F. 3	Contractor to be provided with all HVAC loads to incorporate into EMS system.

Section 26 50 00 - BUILDING LIGHTING SYSTEM

1.	**Building Lighting:**
1. A.	System includes:
1. A. 1.	Provide complete normal and emergency lighting system consisting of fixtures, lamps, ballasts, LED drivers, and controls.
1. A. 2.	Lighting components, controls, and energy consumption shall conform to the Current IESNA (Illumination Engineering Society of North America) Lighting Handbook, 10th edition, and at a minimum to California Energy Efficiency

	Standards, Title 24, Chapter 2-53.
1. B.	Components:
1. B. 1.	Lamps:
1. B. 1. a.	Four-foot fluorescent lamps shall be dimmable **T-8 lamps** (long life) with a color-correlated temperature of 4100 degrees Kelvin and a color-rendering index (CRI) of 85. Dimmable lamp ballast. Also, where applicable in the design, dimmable **T-5 lamps** (High Efficiency) with a 4100K and 85 CRI may be used. Low mercury, with efficacies above 90 lumens. Standard lamp ballast.
1. B. 1. b.	**Light-Emitting Diode (LED)** lamps shall have a Kalvin temperature of 4000 degrees and a color-rendering index (CRI) of 85. Driver should meet UL1310 Class 2 standards, district to approve use of Class 1 drivers when required.
1. B. 1. b. i.	Lamps shall be LED. Approved Manufacturers: Cree, GE, Osram, or Philips.
1. B. 1. b. ii.	Lamp shall have glass lens, wide beam design - 240° lighting emitting area, efficient efficiency 100/m/w, DLC 2.0 standard. Lamps shall be rated at a minimum 50,000 hours of maintenance free operation to L70 at 15 degrees Celsius.
1. B. 1. c.	**Ceramic Metal halide lamps** shall have color-correlated temperature of 4000 degrees Kelvin and a Color Rendering Index of 75.
1. B. 1. d.	**High pressure sodium lamps** shall be color improved Deluxe Lucalox by General Electric, 2200 degrees Kelvin with a Color Rendering Index of 22.
1. B. 1. e.	Re-lamping: For modernizations where fixtures are to remain, ballasts for non-LED fixtures shall be removed and fixture rewired for LED lamps. Approved Manufacturer (retrofit and replacement): Green Creative
1. B. 2.	Ballasts:
1. B. 2. a.	Fluorescent lamp ballasts shall be electronic type, complying with the requirements of the State of California CEC-Title 20, high power factor, dimming capabilities, and a class A sound rating. Advanced standard ballast.
1. B. 2. b.	High Intensity Discharge lamp ballasts shall be high power factor and the lowest sound rating available. 0.99 PF, and complying with the requirements of the State of California CEC-Title 20, with dimming capabilities.
1. B. 3.	Lighting fixtures:
1. B. 3. a.	Fixture selection to be reviewed with PCCD Department of General Services.
1. B. 3. b.	When LED fixtures are provided, designer shall specify fixtures with replaceable drivers where possible so entire fixture need not be replaced with driver failure.
1. B. 3. c.	Fixtures shall have Total Harmonic Distortion (THD) less than 20%; Power Factor (PF) less than 0.90
1. B. 3. a.	Corridor lighting fixtures, surface mounted or recessed shall be vandal resistant and should provide lighting levels of ten to fifteen (10-15) foot-candles at a minimum height of forty-two (42) inches above the floor.

1. B. 3. b.	Recommendation for classroom luminance shall be specific to activity, media, and task. Shall be per IESNA where activities in classrooms fall within level D and E, which is 30 to 50fc. Most school tasks fall in the D or lower group. Therefore classrooms shall be designed to 30fc, unless specific activities warrant greater fc levels.
1. B. 3. c.	Suggested values for maintained average illuminance readings in typical spaces are as follows: Auditorium: 30fc (high for lecture/testing); Multipurpose room: 50 fc; Gymnasium: 50 fc; Library: 30 fc; Office: 30-50 fc; Locker Rooms: 10-30 fc; Laboratories: 50fc; Circulation Areas: 5-10fc; Dining areas: 20-30 fc (on dimmer); Kitchen: 50-75 fc; Restrooms: 10 fc; Machinery and Equipment Rooms: 50 fc; Storage Rooms: 10-20 fc; Parking garage 5 fc; Pedestrian pathways and plaza: .5fc; Building Exterior: 2 fc; Exterior Corridors: 10 fc; Fire Marshal-designated building entries and entry paths: 1fc
1. B. 3. d.	Motion detection sensors with override switches shall control lighting. Single compartment toilet rooms shall have a timer switch with exhaust fans, and with delay relay (± ten (10) minutes).
1. B. 3. e.	Light lenses shall be parabolic, polycarbonate or acrylic. Polystyrene is not acceptable. Extra lenses shall be provided for all light fixtures (five (5) percent to be supplied to the District maintenance personnel at the completion of construction).
1. B. 3. f.	Provide method of re-lamping all “high” lights either by catwalks or demountable fixtures especially in areas such as Auditorium, Gymnasium, Multi-Purpose, etc.
1. B. 3. g.	District Parking Lot: Gardco (Style) GL (Prefix) Type II (Distribution) 208 Volt -105 Watt, LED (Light Emitting Diode) – BPR (Bronze Paint) Fixture. Gardco “Circa Post Top” fixture with LED lamps for parking pathway lights.
1. C.	Controls:
1. C. 1.	Interior spaces the size of classrooms and smaller shall be controlled via wall mounted line-voltage switching, zoned to provide the flexibility required for classroom instruction integrated with dimming switch and occupancy sensor with dual-technology (passive infrared/ultrasonic).
1. C. 2.	All other interior spaces such as multipurpose rooms, locker rooms, gyms, corridors, auditoriums, toilet rooms, etc., as well as exterior lighting will be controlled by a low-voltage lighting control system. The system will consist of lighting relay panels (LRP's) installed in the electrical rooms adjacent to the lighting panelboards, where control is required. The following is a summary of the requirements:
1. C. 2. a.	The system shall provide the following operational features for the interior lighting control circuits:
1. C. 2. a. i.	Programmable on/off control of each circuit.
1. C. 2. a. ii.	Daylight sensors shall automatically control dimming throughout the day light hours.
1. C. 2. a. iii.	Override “on/off” control of selected relays via local low-voltage switching.

1. C. 2. a. iv.	Programmable building “sweeps” to turn off individual or group zones at specified times.
1.C. 3.	Lighting controls: Square D or district approved equal.
1. D.	The system shall provide the following operational features for the exterior lighting control circuits:
1. D. 1.	On/off control of each circuit via interface with remote exterior mounted photoelectric cell connected to EMS.
1. D. 2.	Programmable off control of each circuit, with provision to schedule lighting during day light conditions.
1. E.	Systems shall be installed for localized control of lighting within specific buildings and shall not be networked together other than to EMS. Provide equivalent to GE TLC Softwired Contactor Panel, or Lithonia’s synergy Lighting controls.

Division 27 – Communications

Section 27 30 00 – DATA COMMUNICATIONS

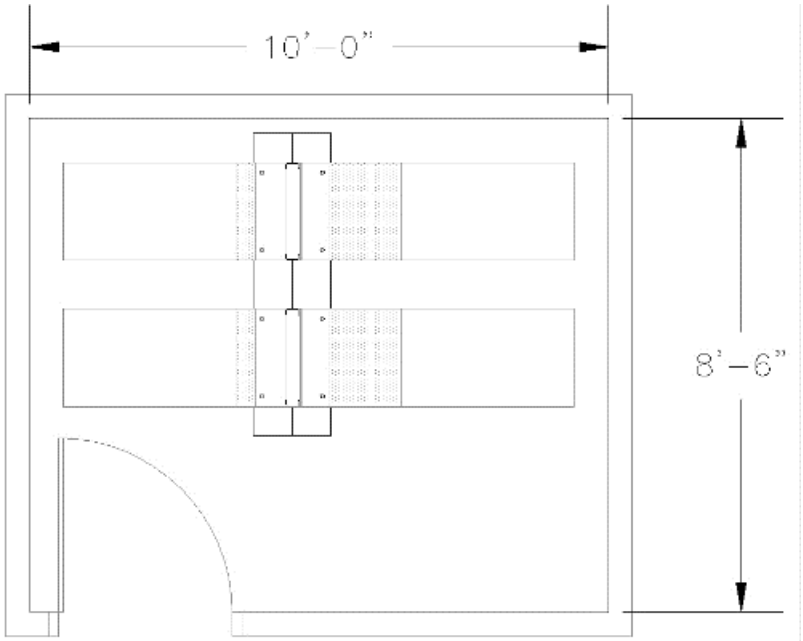
1.	General Network Design Consideration
1. A.	The Designer shall be responsible for all Districts standard to be met. If variance to district standards are not necessary, the designer shall obtain written approval from the district IT project liaison in writing for such variances.
1. B.	The Designer or design team shall issue contract documents to District IT Project Liaison for review, comment, and approval at 100% design development and at 50% construction documents.
1. C.	All projects shall use Category 6 cabling and modular jacks. Where new cable runs are installed unless otherwise specified by Peralta District Information Technology. Cable must be plenum-rated where required by applicable codes.
1. D.	Passive network equipment generally refers to physical layer (OSI Layer 1) network hardware and standards such as cables, jacks, signal testing, etc. and related hardware, such as racks, patch panels, junction boxes, labeling, etc. Passive network equipment also does not, in and of itself, require electrical power. All passive network equipment is supplied, installed and tested by the Contractor. A list of parts or cut sheets shall be provided for review to District IT.
1. E.	Active network equipment generally refers to network devices such as switches, routers, wireless access points, UPS, etc. Active network equipment usually requires electrical power to operate. Active equipment is supplied, installed and configured by Peralta IT or its designated 3rd Party, unless specifically stated otherwise, in which case, the Peralta IT liaison shall approve the device and its application.
1. F.	All projects require clear, legible labeling of cables and faceplates using printed (not hand-written) labels according to District Standards. Please refer to the Labeling

	section of this document for more information. It is the Contractor's responsibility to review the labeling standard and select compatible equipment (High-density patch panels should be avoided).
1. F. 1.	The contractor shall only supply Patch Panels which accommodate labels to identify individual ports. The labels shall be up to 10 characters in length using 7-point Arial font.
1. F. 2.	The contractor shall only supply Faceplates which accommodate labels to identify individual ports. The labels shall be up to 10 characters in length using 7-point Arial font.
1. G.	All projects require cables to be tested. Fiber Optic and Backbone twisted pair cabling links shall have 100% of the pairs tested for wire map and one pair from each 25-pair binder group tested for length. A Test Report bearing the Contractor's stamp shall be submitted to the Project Manager.
1. H.	Unless otherwise specified, all new and renovated network drop locations shall contain 4 data jacks.
1. I.	All projects require appropriate termination of all links. A link consists of a single cable, terminated in the network room into rack-mounted patch panels and terminated in the work area. Cable runs and terminations shall be clean, organized/bundled and physically secured, using appropriate cable management hardware. All terminations shall be compliant with T568B wiring.
1. J.	A standard device consists of 4 links installed in one 4-port faceplate. One standard device will be allocated per Work Area. A Work Area is the physical space planned for one employee at a given time (multiple part-time employees may share a space but will not be physically present at the same time).
1. J. 1.	Offices which can accommodate more than one employee will receive Service consistent with the maximum number of workers the space might accommodate.
1. J. 2.	Each device should be installed on a separate wall (preferably adjacent before opposite)
1. J. 3.	Example: Cubicle for one employee > 4 links in one 4-port faceplate (one Standard Device)
1. J. 4.	Example: Corral for three employees > 12 links in three 4-port faceplates (three Standard Devices)
1. J. 5.	Example: Large Office which could hold two, but is currently occupied by one person > 8 links in two 4-port faceplates (two Standard Devices)
1. K.	Unless otherwise specified, "Executive" offices, which can additionally accommodate conference or work tables, will have 4 data jacks installed on each wall > 16 links in four 4-port faceplates (four standard devices).
1. L.	The structured cabling system installer shall have a current and active contractor's license, either C7 or C10 level, in the state of California.

2.	Space Planning
2. A.	Room Classifications:
2. A. 1.	**Entrance Facility / EF or Main Point of Entry / MPOE:**
2. A. 1. a.	The EF/MPOE shall be a room dedicated to datacom, and shall be shared with other building services, unless authorized in writing by the district.
2. A. 1. b.	Campus/inter Building conduits should enter the building into the EF/MPOE.
2. A. 1. c.	Datacom equipment may or may not be deployed in the EF.
2. A. 1. d.	If applicable, the telecom utilities should demarcate/establish MPOW for their services in the EF.
2. A. 2.	**Main Distribution Facility / MD:**
2. A. 2. a.	The MDF shall be a room dedicated to datacom, and shall not be shared with other building services, unless authorized in writing by the district.
2. A. 2. b.	The core network equipment serving data communications to the main building should be deployed in the MDF.
2. A. 2. c.	If applicable, the WAN interface to the District office should be deployed in the MDF, in direct connection to the network core.
2. A. 2. d.	The MDF may also act as a BDF and/or an IDF.
2. A. 3.	**Building Distribution Facility / BDF:**
2. A. 3. a.	The BDF shall be a room dedicated to datacom, and shall not be shared with other building services, unless authorized in writing by the district.
2. A. 3. b.	The distribution network equipment serving data communications within a single building should be deployed in the BDF.
2. A. 3. c.	In there are/will be additional datacom rooms (IDFs) within the building, the backbone cabling shall originate in the BDF to each IDF.
2. A. 3. d.	The BDF may also act as an IDF.
2. A. 4.	**Intermediate Distribution Facility / IDF:**
2. A. 4. a.	The IDF shall be a room dedicated to datacom, and shall not be shared with other building services, unless authorized in writing by the district.
2. A. 4. b.	The access network equipment serving tat communications within a service area shall be deployed in the IDF.
2. A. 4. c.	If applicable, the backbone cabling from the BDF will terminate in the IDF.
2. A. 4. d.	UPSs will be deployed into the IDFs to support PoE applications such as VoIP (i.e., keeps telephones powered).

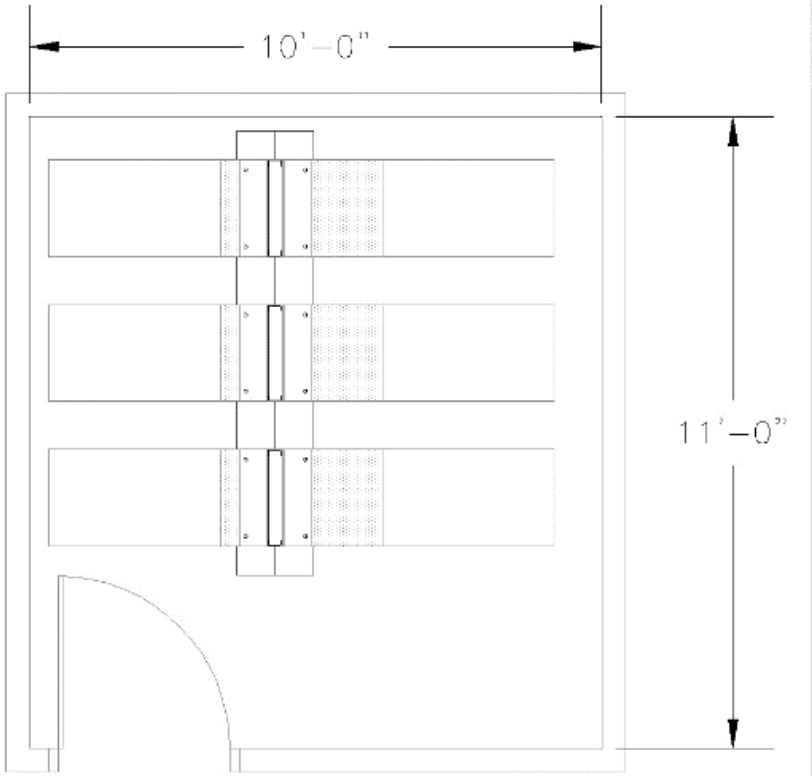
2. A. 5.	**Satellite Distribution Facility / SDF:**
2. A. 5. a.	The SDF shall be an equipment enclosure or cabinet dedicated to datacom, and shall not be shared with other building services, unless authorized in writing by the district.
2. A. 5. b.	Where no rooms/spaces can be programmed and allocated as a dedicated catacomb room and the quantity of links is 96 or less and the service area is 10,000 square feet or less, access network equipment and cable terminations may be located into a service cabinet.
2. A. 6.	**Equipment Room / Server Room:**
2. A. 6. a.	The equipment room / Server room shall be a rom dedicated to datacom, and shall not be shared with other building services, unless authorized in writing by the district.
2. A. 6. b.	The equipment / server room shall be outfitted with equipment racks to house network equipment (switches, routers, etc..) and server cabinets to house processing systems (servers, storage systems, etc.).
2. B.	**Room Sizes:**
2. B. 1.	New Construction: Size the datacom room based on the following criteria: **Rooms: - Sizing Criteria – Minimum Dimensions** (finish to finish) EF - 10’-0” wide X 8’-6” Deep, 9’-0” Ceiling MDF - 10’-0” wide X 16’-0” Deep, 9’-0” Ceiling EF & MDF - 10’-0” wide X 18’-6” Deep, 9’-0” Ceiling or 16’-0” wide X 11’-0” Deep, 9’-0” Ceiling BDF - 10’-0” wide X 14’-6” Deep, 9’-0” Ceiling IDF - 10’-0” wide X 11’-0” Deep, 9’-0” Ceiling SDF - Not Applicable Equipment/Server Room - As Required per project
2. B. 2.	Renovation:
2. B. 2. a.	This document acknowledges that datacom rooms are often located within existing spaces and may not meet the aforementioned minimum sizing criteria. Under these circumstances, determine the feasibility of the space based on the following criteria:
2. B. 2. b.	Minimum size for MDF/BDF/IDF rooms shall be as follows: Width: 8’-10”, including equipment and working clearances. Depth: 6’-0”, (3’-0” for the rack with 3’-0” for end clearance) for the first rack plus 28 inches for each additional rack.
2. B. 3.	Room Adjacencies:
2. B. 3. a.	In new construction and renovation projects, the datacom rooms shall be vertically stacked, shall either encompass or be immediately adjacent to the vertical riser, and should be in close proximity to the electrical room.
2. C.	Reference Figures: The following room configurations are examples of configurations based on rack quantity per room.

2. C. 1.



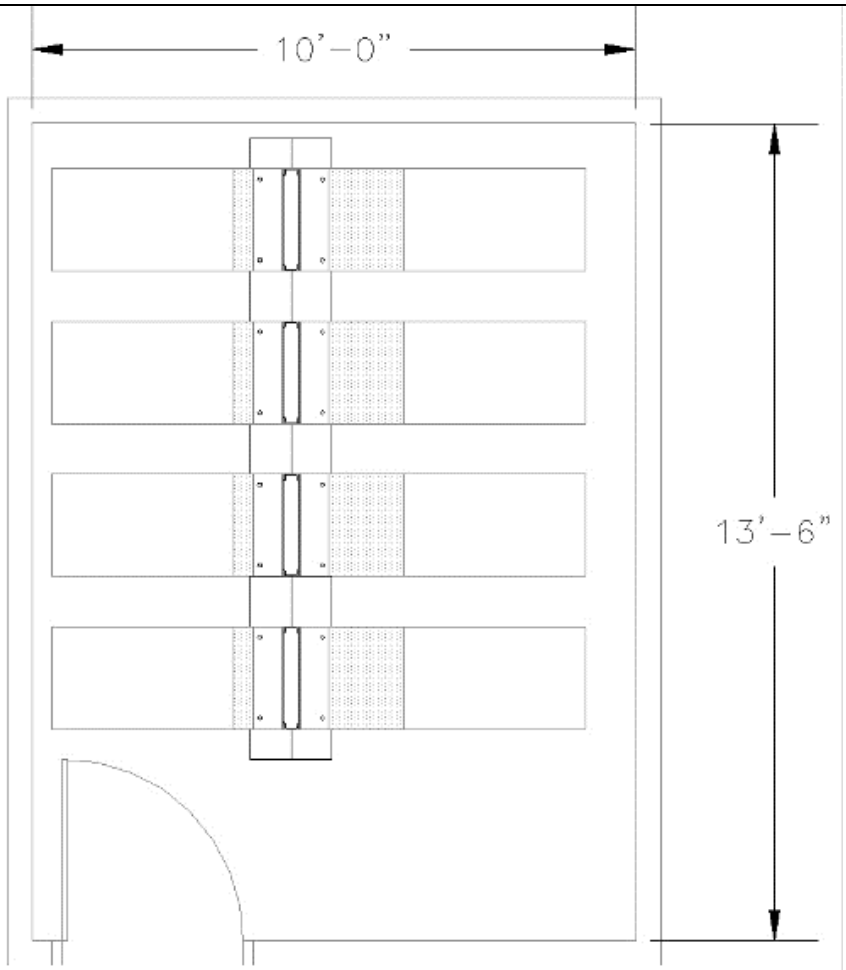
2-Rack Configuration

2. C. 2.



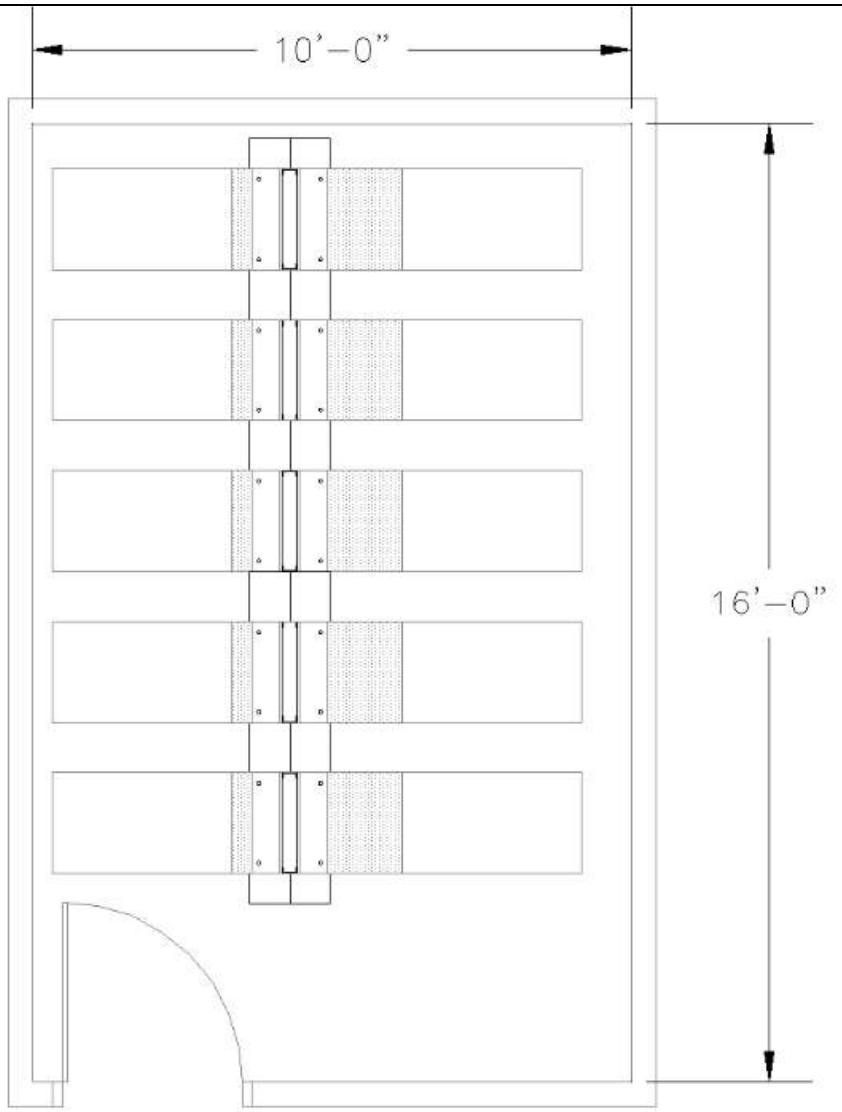
3-Rack Configuration

2. C. 3.



4-Rack Configuration

2. C. 4.



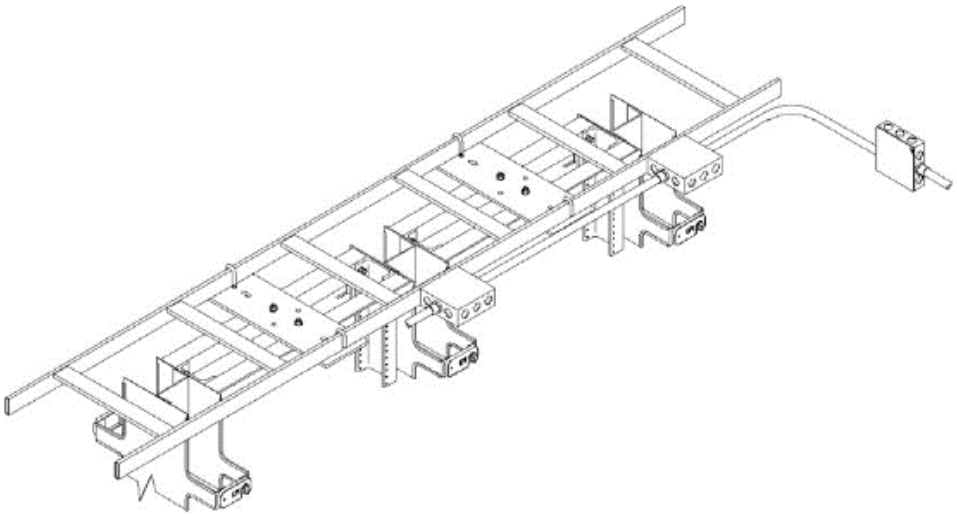
5-Rack Configuration

2. D. **Architectural Finishes:**

2. D. 1. The Room finishes shall be as described in the following table:

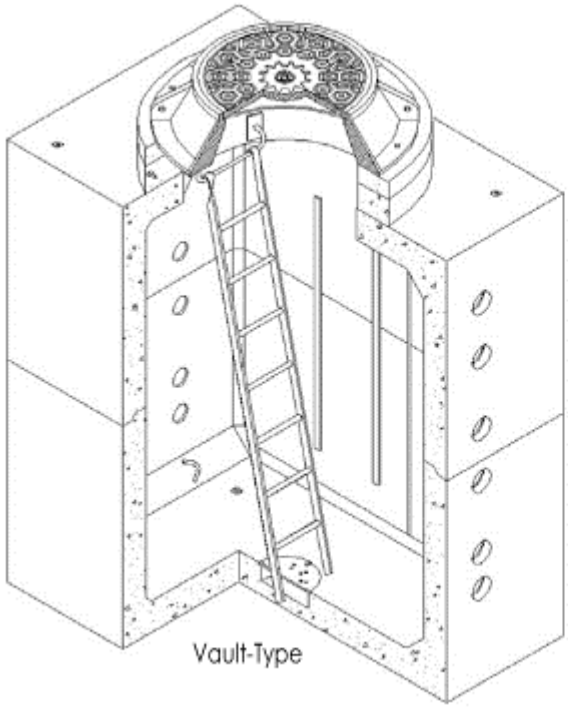
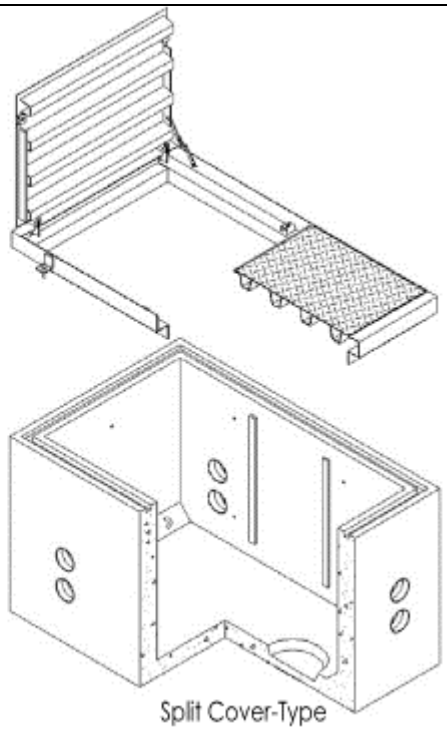
Room	Floor	Wall	Ceiling
EF	SD-VCT[1], or sealed concrete	Plywood backboard[2], all walls	Open (i.e., no ceiling)
MDF	SD-VCT[1], or sealed concrete	Plywood backboard[2], all walls	Open (i.e., no ceiling)
BDF	SD-VCT[1], or sealed concrete	Plywood backboard[2], all walls	Open (i.e., no ceiling)

	IDF	SD-VCT[1], or sealed concrete	Plywood backboard[2], all walls	Open (i.e., no ceiling)
	SDF	Not applicable	Not applicable	Not applicable
	Equipment / Server Room	SD-VCT[1], or sealed concrete – the flowing shall be determined per project. There may be instances where a raised floor would be required.	Wallboard – The wall finish should match typical building wall finishes (to control costs).	Lay-in acoustical tile – the ceiling shall be determined per project.
2. D. 1. a.	1 - SD-VCT = Static-dissipating vinyl composition tile 2 – Plywood shall be ¾" thick and shall be fire treated. Plywood backboard shall be painted with white and shall have the fire rating stamp masked prior to painting.			
2. E.	**Doors:**			
2. E. 1.	The Doors to datacom rooms shall be as described in the following table (minimum dimensions):			
	Room	**Size**	**Quality**	**Swing**
	EF	36"W x 7'H	1	Outward
	MDF	36"W x 7'H	1	Outward
	BDF	36"W x 7'H	1	Outward
	IDF	36"W x 7'H	1	Outward
	SDF	Not Applicable	Not Applicable	Not Applicable
	Equipment / Server Room	72" W – double 36" W doors x 7' H	Door Quantity will be defined per project.	Outward
2. F.	**Structural:**			
2. F. 1.	Floor Loading:			
2. F. 1. a.	The floor loading shall be 150 pounds per square-foot, minimum, in all datacom rooms.			
2. F. 1. b.	Floor Anchoring for Racks and Cabinets: Floor-Standing racks and cabinets shall be anchored to the structural floor via explanation anchors per-approved by DSA. I.E. Hilit Kwik-Bolt 3.			
2. F. 1. c.	The structural engineer shall determine the applicability of the anchoring device set in the floor system, including minimum embedment depth.			
2. F. 2.	Wall anchoring for racks and cabinets:			
2. F. 2. a.	Wall-mounted racks and cabinets shall be anchored to the wall via fasteners per-approved by DSA. Examples of such fasteners include wood screws into plywood backboard and expansion anchors into concrete walls.			

2. G.	**Electrical:**
2. G. 1.	Convenience Outlets:
2. G. 1. a.	Convenience outlets shall be 120V. convenience outlets shall be circuited from a normal power panel.
2. G. 1. b.	On walls adjacent to the rack bay (where the rack bay butts up against the wall), provide one duplex outlet in front of the rack bay and one duplex outlet behind the rack bay.
2. G. 1. c.	On the other walls, provide one duplex outlet per wall up to 15 feet. On walls longer than 15 feet, provide two duplex outlets.
2. G. 2.	Rack Bay power Service:
2. G. 2. a.	Each rack receives one duplex outlet. Each duplex outlet shall be circuited as 120 V 20 A separately breakered.
2. G. 2. b.	Reach duplex outlet shall be installed between racks at the vertical management section facing down. Refer to the figure below for an example of the overhead power service at a rack bay.
2. G. 2. c.	 **Example Overhead Power Distribution at Rack Bay**
2. G. 3.	Lighting:
2. G. 3. a.	Lighting shall be overhead in front of and behind rack bay, and should be LED type.
2. G. 3. b.	Luminance shall be 50 foot-candles measured at 3 feet above finished floor minimum.
2. H.	**Mechanical:**
2. H. 1.	Cooling Criteria:
2. H. 1. a.	For MDFs, BDFs, and IDFs, assume a load of 40 watts per square foot. For Equipment/Server Rooms, assume a load of 75 watts per square foot.

2. H. 1. b.	The aforementioned criteria include the following sources: equipment, lighting, occupants, ambient.
2. H. 2.	Operation:
2. H. 2. a.	The cooling shall operate 24 hours per day, 7 days per week.
2. H. 3.	Temperature Range:
2. H. 3. a.	The rooms shall be controlled at 68 degrees Fahrenheit, +/- 5 degrees.
2. H. 4.	Dedicated Controls:
2. H. 4. a.	Cooling controls (thermostat) shall be dedicated to the datacom room and shall not be shared with any other space.
2. H. 5.	Humidity Control:
2. H. 5. a.	For MDFs, BDFs, and IDFs, no humidity control is required.
2. H. 5. b.	For Equipment/Server Rooms, humidity control is required. Humidity shall be controlled between 10% and 55%, non-condensing within the specified temperature range.
2. H. 5.	Installation
2. H. 5. a.	For MDFs, BDFs, and IDFs, the cooling unit (fan coil unit or other) shall be installed either hung from the structure above or high on the wall.
2. H. 5. b.	For Equipment/Server Rooms, the cooling unit (CRAC, other) shall be coordinated throughout the Design Team. To minimize floor area, the cooling unit is suggested to be hung from the structure above.
2. H. 5. c.	The location of the cooling unit shall be coordinated with the equipment plan as not to have wet components above the equipment racks or other equipment that could be damaged by leaks. The piping to the cooling units shall be routed as not to pass over the rack bay and the equipment clearance of the rack bay.
2. H. 5. d.	Piping connections shall not be installed over where equipment may be installed.
2. H. 6.	Ducting Through Datacom Rooms:
2. H. 6. a.	Ducting unrelated to datacom shall not be routed through datacom rooms.
2. I.	**Piping Through Datacom Rooms:**
2. I. 1.	Piping and plumbing unrelated to datacom shall not be routed through datacom rooms.
2. J.	**Security:**
2. J. 1.	Access Control:
2. J. 1. a.	Datacom rooms shall have access control, even if the room is shared with other services. The access control should be a card reader, confirm requirements with district for individual projects.
2. J. 2.	Video Surveillance

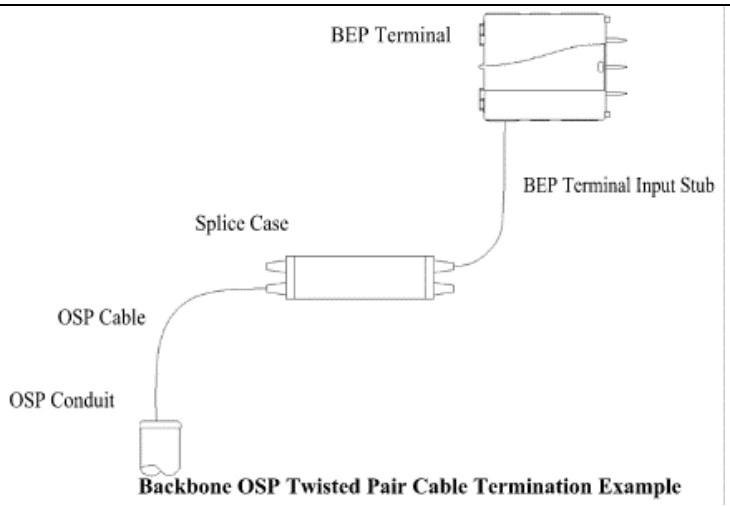
2. J. 2. a.	Datacom rooms do not require video surveillance.	
2. K.	**OSP Underground Pathways**	
2. K. 1.	Underground Pathway Infrastructure, minimum burial depth shall be 36 inches.	
2. K. 2.	The following conduit types will be accepted for the different circumstances:	
2. K. 2. a.	**Circumstance**	**Acceptable Conduit Types**
	Straight Sections, no vehicular traffic	• Non-Metallic Schedule 40 PVC, concrete encasement not required • Non-Metallic Schedule 80 PVC, concrete encasement not required • Galvanized Rigid Steel / GRS
	Straight Sections, under vehicular traffic	• Non-Metallic Schedule 40 PVC, with concrete encasement • Non-Metallic Schedule 80 PVC, with concrete encasement • Galvanized Rigid Steel / GRS
	Sweeping Bends	• Non-Metallic Schedule 40 PVC, with concrete encasement • Non-Metallic Schedule 80 PVC, concrete encasement suggested • Galvanized Rigid Steel / GRS
	Factory Bends/Elbows	• Non-Metallic Schedule 40 PVC, with concrete encasement • Non-Metallic Schedule 80 PVC, with concrete encasement • Galvanized Rigid Steel / GRS, with concrete encasement
	Building Entrance	• Galvanized Rigid Steel / GRS, with concrete encasement
2. K. 3.	The maintenance holes shall have the following features	
2. K. 3. a.	For split cover-type maintenance holes/pull boxes, the minimum size shall be 36-inches wide by 48-inches deep by 60-inches long. For vault-type maintenance holes/pull boxes, the minimum size (interior clearances) shall be 48-inches wide by 84-inches deep by 60-inches long.	
2. K. 3. b.	The maintenance hole shall be equipped with a sump, corrosion-resistance pulling irons, corrosion- resistance cable racks, and grounding.	
2. K. 3. c.	**Maintenance Holes Examples:**	

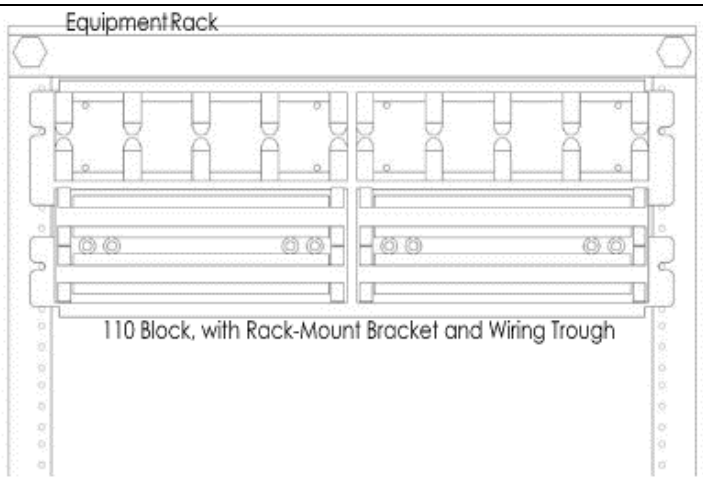
	 	
2. K. 3. d.	At buildings, install the conduit sloping toward away from the building with no less than 0.125 inches per linear foot of slope	
2. K. 3. e.	Between maintenance holes, install the conduit sloping towards maintenance holes with no less than 0.125 inches per linear foot of slope.	
2. K. 4.	Service Per Building	
2. K. 4. a.	Each building shall receive two 4-inch trade size conduits, minimum, from the campus' telecommunications underground pathways infrastructure.	
2. K. 5.	Building Connection:	
2. K. 5. a.	Within 15 feet of the point where the conduit enters the building, the conduit type shall be GRS. Non- metallic / PVC conduit will not be accepted.	
2. K. 6.	Innerduct	
2. K. 6. a.	At least one of the service conduits shall contain four 1-inch trade size innerducts. Each innerduct shall be uniquely colored. The innerducts should be corrugated type and should be extruded of high-density polyethylene.	
2. K. 7.	Separation	
2. K. 7. a.	Datacom Conduits shall be separated from other underground structures as follows:	
2. K. 7. b.	**Structure**	**Separation**
	Power, concrete-encased	3 inches
	Power, buried	12 inches

	Power, on poles	Separate poles if possible; if not possible, 90 degrees, minimum
2. L.	**Building Pathways**	
2. L. 1.	**Backbone Pathways**	
2. L. 1. a.	The building pathways for backbone cabling should be either conduit or cable basket. The pathway component will depend on the project requirements, constraints, and coordination with the other building systems.	
2. L. 1. b.	 Image of Cable Pathway Component	
2. L. 2.	Horizontal Pathways:	
2. L. 2. a.	The horizontal pathways shall be defined as those pathway components that support horizontal cabling. These pathways are generally limited to a single floor from a datacom room or riser system.	
2. L. 2. a. I.	Primary Pathways: The primary horizontal pathways shall be defined as those directly from the datacom room serving a section (a wing or side) of the building. The primary pathway components can be cable basket, or – if the total quantity of cables is less than 50 – cable hangers.	
2. L. 2. a. II.	Secondary Pathways: The secondary horizontal pathways shall be defined as those from the primary pathways serving an area of a section or to specific devices. The secondary pathway components can be cable hangers or, as an alternative, “Snake Tray” (by Cable Management Solutions).	
2. L. 3.	Device Pathways	
2. L. 3. a.	The device pathways shall be defined as the pathway supporting a single compliment of cabling to a single device.	
2. L. 3. a. I.	Minimum conduit stub, or equivalent area, shall be 1-inch trade size.	
2. L. 3. a. II.	Device box shall be 4-square and deep.	

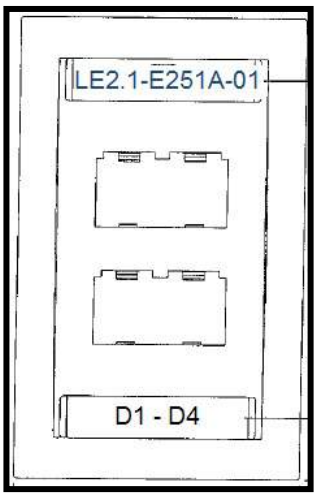
2. L. 3. a. III.	Framed Wall: For both new construction and renovation, the device pathway at framed walls shall be conduit stub from an accessible space (such as acoustical tile ceiling) to a device box within the wall interstitial. The device box should be installed at +18 inches for typical outlets.
2. L. 4.	Concrete Wall:
2. L. 4. a.	New Construction: The device pathway at concrete walls shall be buried (cast within the forms) into the wall.
2. L. 4. b.	Renovation: The device pathway at concrete walls shall be either conduit surface-mounted to a device box surface-mounted or shall be surface raceway to a device box surface-mounted.
2. L. 5.	CMU Wall:
2. L. 5. a.	For new construction and renovation, the device pathway at CMU walls shall be either conduit surface-mounted to a device box surface-mounted or shall be surface raceway to a device box surface-mounted.
2. M.	**Backbone Cabling:**
2. M. 1.	Backbone Fiber Optic Cabling
2. M. 1. a.	Outdoor Cables
2. M. 1. a. I.	Backbone fiber optic cables installed outdoors shall be loose buffered – either multitube or core tube type.
2. M. 1. a. II.	Backbone fiber optic cables installed outdoors should have a sheath consisting of a polyethylene jacket over the inner cable components (buffer(s), strength element, etc.).
2. M. 1. b.	Indoor Cables
2. M. 1. b. I.	Backbone fiber optic cables installed indoors shall meet the rating required by the authority having jurisdiction.
2. M. 1. b. II.	Backbone fiber optic cables installed indoors shall be tight buffered.
2. M. 1. b. III.	Backbone fiber optic cables installed indoors should have a sheath consisting of a thermoplastic jacket over the inner cable components (buffered fibers, strength element, etc.), an interlocking armor, and overall thermoplastic jacket. This cable does not require to be installed in innerduct.
2. M. 2.	Fiber Type:
2. M. 2. a.	Multimode: Multimode fibers shall be 50/125µm laser-grade, with a minimum bandwidth of 500/1000 MHz-km at 850/1300 nm. Single mode: Single mode fibers shall be 8.3/125µm, with a maximum dispersion of 3.5 ps/µmkm at 1285- 1330µm, and a cutoff wavelength of 1260 nm.

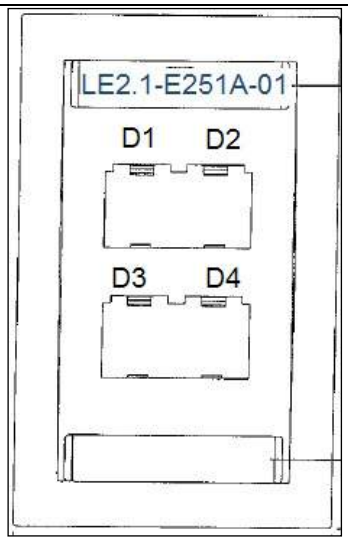
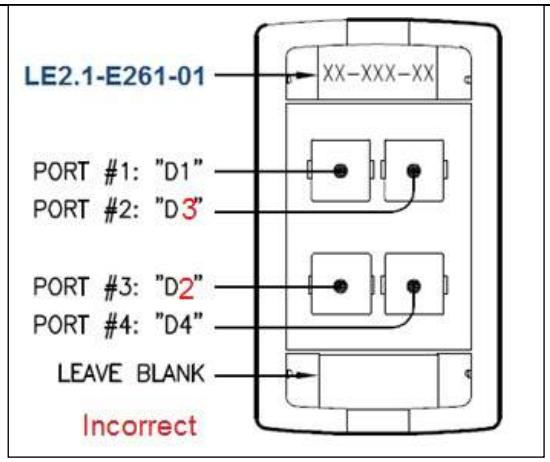
2. M. 3.	Cable Capacity / Conductor Count		
2. M. 3. a.	Interbuilding Cabling (MDF to MPOE):		
2. M. 3. a. I.	Interbuilding cabling links should contain twelve multimode strands and twenty-four single-mode strands. Additional twelve strands for each additional IDF room within the building.		
2. M. 4.	Intrabuilding Cabling (IDF to MDF):		
2. M. 4. a.	Intrabuilding cabling links should contain twelve multimode and twelve single mode strands.		
2. N. 5.	**Termination:**		
2. N. 5. a.	Connectors:		
2. N. 5. a. I.	Multi-mode fibers shall be terminated via multi-mode LC connectors. LC connectors shall be 568LC type, and shall meet all requirements of TIA/EIA-568-B.3, section 5.0 including references. The connector housing and the boot shall be beige in color		
2. N. 5. a. II.	Single mode fibers shall be terminated via single mode LC connectors. LC connectors shall be 568LC type, and shall meet all requirements of TIA/EIA-568-B.3, section 5.0 including references. The connector housing and the boot shall be blue in color		
2. N. 6.	Patch Panel:		
2. N. 6. a.	The patch panels shall be rack-mount type and shall be installed into an equipment rack.		
2. N. 7.	Adapters		
2. N. 7. a.	Adapters within the patch panels shall meet all requirements of TIA/EIA-568-B.3, section 5.0 including references.		
2. N. 7. b.	Multi-mode adapter housing shall be beige in color and shall be duplex.		
2. N. 7. c.	Single mode adapter housing shall be blue in color and shall be simplex.		
2. N. 8.	Testing		
2. N. 8. a.	Each fiber shall be tested as follows:		
2. N. 8. b.		**Passive Link Insertion Loss**	**Characterization**
	Multi-mode	Uni-directional, 850nm and 1300nm	Bi-directional, 850nm and 1300nm
	Single mode	Uni-directional, 1310nm and 1550nm	Bi-directional, 1310nm and 1550nm
	Passive Link Insertion Loss testing for multimode fibers shall comply with TIA/EIA-526-14A (“OFSTP-14”) “Test Method B: One Jumper Reference”. Passive Link Insertion Loss testing for singlemode fibers shall comply with TIA/EIA-526-7 (“OFSTP-7”) “Test Method A.1: One Jumper Measurement”.		
2. N. 9.	**Backbone Twisted Pair Cabling:**		
2. N. 9. a.	Outdoor Cables: Backbone twisted pair cables installed outdoors shall be gel-filled and should be AMNW type.		

2. N. 9. b.	Indoor Cables: Backbone twisted pair cables installed indoors shall meet the rating required by the authority having jurisdiction.
2. N. 9. b. I.	Backbone twisted pair cables installed indoors should be ARMM type.
2. N. 10.	Cable Capacity / Conductor Count:
2. N. 10. a.	Interbuilding Cabling: twisted pair cabling links should contain 50 pairs.
2. N. 10. b.	Intrabuilding Cabling: twisted pair cabling links should contain 25 pairs.
2. N. 11.	Termination:
2. N. 11. a.	Interbuilding Cabling: twisted pair cabling links shall be terminated to building entrance protection terminals, wall-mounted, with a splice between the OSP cable and the BEP's input stub. See following example.
2. N. 11. a. I.	 **Backbone OSP Twisted Pair Cable Termination Example**
2. N. 11. b.	Intrabuilding Cabling: twisted pair cabling links should be terminated onto 110 blocks on rack-mount bracket.

2. N. 11. b. I.	 **Backbone OSP Twisted Pair Cable Termination Example**
2. N. 12.	Testing
2. N. 12. a.	Backbone twisted pair cabling links shall have 100% of the pairs tested for wire map and one pair from each 25-pair binder group tested for length.
2. O.	**Horizontal Cabling**
2. O. 1.	Link Performance: Link performance shall be Category 6a.
2. O. 2.	Datacom Room Termination: In the datacom rooms, links shall be terminated via a rack-mounted modular patch panel. Modular patch panels should be either discrete port type (snap-in modular connectors) or pre-assembled 110 termination type. If discrete port type, also refer to “Modular Jacks” following.
2. O. 3.	Workstation Termination: Links shall be terminated via modular jacks – refer to “Modular Jacks” following.
2. O. 4.	Modular Jacks: Modular jacks shall be 8-position 8-conductor type connectors, compliant with T568B wiring.
2. O. 5.	Service, Per Work Area: A standard device shall consist of two links to a single device. A link shall consist of a single cable, termination in the datacom room and termination at the work area. The device shall consist of one faceplate and two modular jacks.
2. O. 5. a.	Fixed Office: Fixed offices shall receive at least two standard devices generally on separate walls. If the fixed office is large enough and intended to support multiple workstations, add one standard device per additional workstation.
2. O. 5. b.	Open Office: Generally, open offices shall receive one standard device per workstation.
2. O. 5. c.	Classroom: Generally, classrooms shall receive two standard devices – one at the front of the room and one at the back of the room.

2. O. 5. d.	WLAN Access Point: Access points shall receive two links. The deployment shall be determined per project as the coverage area is building specific. Also, the installation shall very per instance (wall mount, ceiling mount, etc.).
3.	**Construction Considerations**
3. A.	The Project Manager shall give reasonable notice to the District and College Information Technology Staff of the anticipated completion of the Contractor's work and planned occupancy dates.
3. B.	Information Technology staff are responsible for installation and testing of active network components (routers, switches, etc). However, this work cannot be performed until passive equipment (cables, patch panels, jacks, etc) is fully installed, labeled and tested by the Contractor. The completion of passive network equipment work must occur reasonably in advance of the scheduled occupancy date, and no less than one week. The magnitude of the project Scope dictates the required amount of time needed for active component installation and testing
3. C.	Owner-Provided Equipment:
3. C. 1.	Datacom Network Equipment:
3. C. 1. a.	PCCD District IT Department will design, procure, and install the data network equipment (e.g., Switches).
3. C. 1. b.	Space in the racks shall be designed to allow for the network equipment and patch cords to be installed. Obtained from PCCD IT rack requirements.
3. C. 2.	Telecom and VoIP Equipment:
3. C. 2. a.	PCCD District IT Department will design, procure, and install the telecom equipment (e.g., IP telephones).
3. D.	Installer Qualifications:
3. D. 1.	The Structured cabling system installer shall have a current and active contractor's license, either C7 or C10 level, in the state of California.
3. D. 2.	The structured cabling system installer shall be a current and active Panduit certified installer (PCI).
3. D. 3.	The Structured cabling system installer shall be certified by Panduit for coverage under the Panduit certification plus system warranty program.
4.	**Administration / Labeling**
4. A.	The contractor is responsible for labeling of all passive network equipment.
4. A. 1.	The below Panduit patch panels and faceplates are preferred by Peralta for their labeling features. It is the Contractors responsibility to review the labeling standard and select compatible equipment. **High-density patch panels, should be avoided.**
4. A. 2.	All network cables and face plates shall be clearly labeled according to the below standards using clear and legible labels printed in 7-point Arial Font. Handwritten labels are not acceptable.

4. B.	**Labeling standards:** 1. Horizontal Cable Labeling 2. Outlet Labeling 3. Individual Ports at the Modular Patch Panels 4. Wireless access point: 5. Fiber Optic Backbone 6. Equipment Rack Label
4. B. 1.	**Horizontal Cable Label:** Example: "AD1.1-D107-01-D1-CAT5E" **First Field:** The originating MDF/BDF/IDF room identity; example: "AD1.1" **Second Field:** the destination room number; example: "D107" **Third Field:** Sequential outlet number; example: "01" (1st outlet in the room) **Fourth Field:** Sequential port number; example: "D1" ('D' for data service, '1' port number of outlet) **Fifth Field:** Cable type; example: 'CAT5E"
4. B. 2.	**Outlet Label:** Example: "AD1.1-D107-01" **First Field:** Originating MDF/BDF/IDF room identity; example: "AD1.1" **Second Field:** Destination room number; example: "D107" **Third Field:** unique sequential outlet number; example: "01" (1st outlet in the room) **Port Labeling at outlets:** Example: "D1" ('D' data service) Ref. **Figure 1** for port sequencing, and labeling location. Ref. **Figure 2** below alternate labeling.
4. B. 2. a.	 **Figure 1** –Preferred labeling method **(This method is required for all projects at Laney College)**

4. B. 2. b.	 **Figure 2** – Acceptable substitute labeling method for non-Laney projects.
4. B. 2. c.	 **Figure 3 -** Incorrect progression: Port numbers should not progress down columns.
4. B. 3.	**Individual Ports at the Modular Patch Panels Label:** Example: "D107-D1" **First Field**: the end user room number; example: "D107" **Second Field**: Outlet Port Number; example: "D1" ('D' for data service, '1' first port in the outlet.
4. B. 4.	**Wireless Access Point Label:** Wireless AP Label: Example: "AD107-AP1-9AFF" **First Field:** The end user room number; Example: "AD107" **Second Field:** Sequential wireless access point (AP) number; Example: "AP1" **Third Field:** Last four (4) digit of the access point (AP) ethernet port MAC Address; example: "9AFF"
4. B. 5.	**Fiber Optic Backbone Label:** Backbone Cable Label: Example: "AD1.1-AD3.1-F6-01-12" **First Field:** The originating MDF/BDF room identity; Example: "AD1.1". **Second Field:** the destination BDF/IDF room identity; Example: "AD3.1". **Third Field:** the cable type; example: "F6" (fiber optic, 62.5/125 multimode). **Fourth Field:** Beginning strand count served from originating room; Example "01". **Fifth Field:** Ending strand count served from originating room; Example: "12"

4. B. 6.	**Equipment Rack Label:** Example: "LE2.1-R05" **First Field:** the MDF/BDF/IDF room identity; for example: "LE2.1" **Second Field:** the sequential rack number; for example: "R05".
	Equipment rack label reference figure: 

Section 27 41 00 – AUDIO-VIDEO SYSTEMS

1.	**Projection System Provisions:**
1. A.	General Application: Typical classroom.
1. A. 1.	Re-use existing where possible
1. A. 2.	Coordinate with PCCD for network configurations and/or setting required for the system's proper or correct operation.
1. A. 3.	Labeling: provide labeling for audiovisual system components. The components include, but are not limited to the following:
1. A. 3. a.	Equipment racks and equipment enclosures
1. A. 3. b.	Rack-mounted equipment and devices: provide a label on the back of each piece of equipment. If serial number (of a given piece of equipment) is not visible in a final installed condition, provide a label on the equipment on a visible location duplicating serial number.
1. A. 3. c.	Wall-mounted equipment and devices: Provide an equipment label on the back on each piece of equipment. If a serial number (of a given piece of equipment) is not visible in a final installed condition, provide a label on the equipment on a visible location duplicating serial number.
1. A. 3. d.	Provide an equipment plate for each piece of equipment
1. A. 3. e.	Provide a label for each control that is not inherently labeled, such as those in racks and user spaces.

1. A. 3. f.	Wires and cables: Provide a cable label at each end of a piece of wire, cable, and cord.
1. A. 3. g.	Terminal blocks, patch panels and other termination apparatus: Provide a label on each terminal block, piece of termination apparatus and terminations position on patch panels.
1. A. 3. h.	Handheld, lavalier, wireless, and other microphones and associated equipment (such as receivers)
1. A. 3. i.	User interface devices/ plates
1. A. 4.	Alternates: Submit a written request for modification to an installation practice desired or required which is contrary to these specifications. Obtain Witten approval from PCCD prior to project Bidding.
1. B.	Audio System:
1. B. 1.	Provide Echo Cancellation for Microphones in audio and video conferencing systems.
1. B. 2.	Program Audio System:
1. B. 2. a.	Frequency Response: 100Hz to 12,000Hz. 3 dB per octave roll off below 100Hz and above 12kHz
1. B. 2. b.	Total Acoustical Harmonic Distortion: Less than 2% at 90 dBC (1 kHz reference) at four feet (1,220 mm) above finished floor in the middle of the room.
1. B. 3.	Distributed Audio System:
1. B. 3. a.	Frequency Response: 125Hz to 10,000Hz. 3 dB per octave roll off below 125Hz and above 10kHz
1. B. 3. b.	Total Acoustical Harmonic Distortion: Less than 2% at 85 dBC (1 kHz reference) at four feet (1,220 mm) above finished floor in the middle of the room.
1. B. 4.	Signal to noise ratio (mixer input to amplifier output): 75 dB from 50Hz to 15kHz minimum.
1. B. 5.	Frequency response with equalizers bypassed: less than ±1dB from 50Hz to 12kHz
1. B. 6.	Distortion: less than 0.5% at 1kHz at te equipment's rated input signal level.
1. B. 7.	Output levels in audience areas without objectionable distortion, rattles, or buzzes employing as test signals several different samples of recorded music and microphones applied at each system input.
1. B. 7. a.	Program Audio: not less than 95 dB
1. B. 7. b.	Speech reinforcement: not less than 85 dB
1. C.	Video System:
1. C. 1.	Provide system components with a minimum resolution capability of 1920 X 1080

1. C. 2.	Provide system that supports the following resolutions: - 1,280 x 720 - 1,920 x 1,080 - 1,920 x 1,200 - 3,840 x 2,160 - 4,096 x 2,160
1. C. 3.	Direct-view Display Systems: provide displays that have no more than seven defective pixels per quadrant, or per manufacturer's specifications.
1. D.	Control System:
1. D. 1.	Provide user interfaces such as control panels, that respect ergonomics and varying levels of technical ability among users. Follow these guidelines
1. D. 1. a.	Avoid abbreviations
1. D. 1. b.	Size lettering at 1/8" minimum
1. D. 1. c.	Maintain background to lettering contrast.
1. D. 2.	Positive Logic: Avoid conditions which may cause command synchronization conflicts (i.e., alternate action (Toggling) on/off without power rest of feedback.
1. D. 3.	Timing: Prevent two or more commands being sent simultaneously to the same piece of equipment.
1. D. 4.	Linking: provide linking of functions to require the fewest number of user actions to effectively control the equipment.
1. D. 5.	Clearing: Ensure that each media selection clears the previous audio and visual selection.
1. D. 6.	Defaults: establish default power-up conditions for the system including device audio levels, warmup routine, power conditions, switcher status and other default conditions as required by the owner or owner's representative
1. D. 7.	Volume Memory: Provide easy-to-use memory for volume settings associated with each source device. Provide programming that maintains these settings between alternate selections during each use – through power-on and power-off
1. D. 8.	Status Indication: program buttons for both touch panels and pushbutton panels to provide clear status indication using illumination when back-lightings is available or by changing color.
1. D. 9.	Failsafe: Provide program that ensures that no operation or sequence of operations causes the control system to become inoperable or interferes with further processing, correct operations or execution of commands.
1. E.	Location: Size image for screen height approx. 4-5 times distance to furthest viewer. Allow. Assume contemporary LCD projector throw distances based on current Sharp brand product manuals for image size above. Ceiling mounted
1. F.	Projector Mount: Monger Mount – dual Unistrut with extrusion clip covers

1. G.	Power: Allow 5A at 120V at indicated location
1. H.	**Standard Classroom Equipment:**
1. H. 1.	Audio Equipment:
1. H. 1. a.	Ceiling Mounted Speakers by “Extron”: Model No. **SF – 3C-LP** *Provide option for FF120*
1. H. 1. b.	Ceiling Mounted Speakers by “Extron”: Model No. **SM-3**
1. H. 1. c.	Ceiling Mounted Speakers by “Extron”: Model No. **SM-26** *Provide option for SM-28*
1. H. 1. d.	Assistive Listening System by Listen Technologies: Model No. **Portable 72**
1. H. 2.	Video Equipment:
1. H. 2. a.	5,400 Lumens Laser Video Projector by “Panasonic”: Model No. **PT-RZ570**.
1. H. 2. b.	6,500 Lumen Laser Video Projector by “Panasonic”: Model No. **PT-RZ670**.
1. H. 2. c.	Projector lenses by “Panasonic”: Standard Lens: Model No. **ET-DLE170** *(Include as alternate)* Ultra-short-throw-lens: Model No. **ET-DTE030** *(Include as alternate)*
1. H. 2. d.	Presentation system by “Extron”: Model No. **PVS407D**
1. H. 2. e.	Video extender set by “Extron”: Model No. **DTP T HWP 4K 231 D** Model No. **DTP HDMI 4K 230 RX**
1. H. 2. f.	Wireless collaboration system by “Extron”: Model No. **ShareLine 200N**
1. H. 2. g.	Document Camera by “Elmo” Model No. **TT-12iD**
1. H. 2. h.	Projection Screen by “Da-Lite”: Model No. **B CSR** Standard: 16:10 109” Diagonal, Provide Alternate of 119” diagonal
1. H. 3.	Control System Equipment:
1. H. 3. a.	Control Keypad by “Extron”: Model No. **MLC Plus 200**

1. H. 3. b.	Wall Plate by “Extron”: Model No. **PVT HDMI** Model No. **PVT HDMI/VGA**
1. H. 4.	Accessories
1. H. 4. a.	Equipment Cabinet, Plenum-Rated by “Extron”: Model No. **Plenum Vault – PVM220**
1. J.	Signal cabling provision:
1. J. 1.	Provide cables and wires that are continuous – without splices.
1. J. 2.	Cat6 with matching baluns (computer graphics use).
1. J. 3.	2 shielded audio pairs, terminated on RCA type connectors.
1. J. 4.	3 baseband precision video cables, terminated on HDMI connector (HDMI use).
1. J. 5.	3 Ultra-HD video cable terminated on HDBT connector (composite video signal use).
1. J. 6.	Terminated at presenter input location and at projector on plates in surface raceway and/or on surface mount boxes (Wiremold Activate plates have the necessary connectors).
1. J. 7.	Acceptable cable manufacturers for Plenum rated and non-plenum rated: West Penn, Belden, Extron, Superior Essex, Liberty and Creston

Section 27 21 00 - WIRELESS CRITERIA

1.	**GENERAL**
1. A.	Systems: The WLAN shall be a Cisco system that is 802.11 a,d,n & ac Wave 2 compliant dual band using PoE (power over Ethernet). Dual radio access points shall be installed above ceiling plenum spaces. All information and user authentication is performed at the controller end that will be located within the secured IDF/MDF room.
1. B	Coverage: 100 percent indoor coverage is required. Courtyards and between building coverage shall be provided by installing an access point indoors near the building perimeter with exterior antennae mounted within 6’ of the access point and connected via a contractor supplied coaxial cable. The antennae cable shall be installed through a weather tight conduit penetration to prevent water leaks.
1. C.	The system shall be designed for coverage and RF signal shall not “bleed over” the particular site property line.
1. D.	Signal Strength/Data Rates: A minimum of -65dBm signal at building boundary and access point cell boundaries. Pervasive coverage is required to meet the future requirements of Voice over WLAN, RF Identification and streaming video. By design, data rates are expected to be in the 54 Mbps at 802.11 a, d, n, and ac Wave 2 with the -65dBm signal strength.
1. E.	Request and Refer to ‘PCCD Network and Wi-Fi Standards.pdf’ additional and up to date network standards and structure.

1. F.	The Designer shall be responsible for ensuring that all District standards are met. If variances to District standards are necessary, the Designer shall obtain written approval from the District IT Project Liaison in writing for such variances.
1. G.	The Designer or Design Team Lead shall issue contract documents to District IT Project Liaison for review, comment, and approval at 100% design development and at completion of 50% Construction Documents.
2.	**ACCESS POINTS**
2. A.	Access point Mounting: Install access points above ceiling with manufacture "approved" mounting brackets. Access points shall be installed to meet local and state seismic codes. Each access point must be secured with a wire hangar for seismic support in addition to the mounting bracket.
2. B.	Access Point Quantity and Placement: Access point placement shall be determined by performing an RF survey or by Peralta Community College District Information Technology Department using WLAN vendor system software. Access points shall be placed within five (5) feet of specified location and documented on the "as-built" plans.
2. C	Access Point Rating: Access point shall be plenum rated.
2. D	Access Point Backup Power: Backup power needs to be provided via a centralized or localized UPS with a minimum of 30 minutes run-time.
3.	**SECURITY AND CONTROL**
3. A.	Network Security/Management: Security (physical and network) and management is controlled be the master controller hardware/software and is not addressed in the infrastructure design criteria.
3. B.	WLAN Controller: For new building or remodel projects, provide rack space to install a controller for the building MDF and/or IDF. Final network architecture and controller requirements shall be coordinated with Peralta Community College District Information Technology Department.
4.	**ANTENNAS**
4. A.	Install one (1) 360-degree omni-directional antennae for each access point (usually supplied with the access point) per the manufacture's specifications. In some instances, high gain directional antennas may replace the omni-directional antennas. Determination of antennas type will be made by performing an RF Survey or vendor software recommendation.
5.	**Administration Requirements:**
5. A.	Shipping and receiving: The network contractor is responsible for shipping and coordinating of receiving of network equipment. Equipment shall be stored in a clean secure location until commissioned.
5. B.	Segmentation and Address Space Coordination:

	Active network equipment shall be configured to support VLAN segmentation. Coordination of the VLANs and address spaces must be coordinated by contractor with PCCD IT. Documentation of equipment VLANs and address spaces shall be recorded by contractor and shall include a patching matrix.
5. C.	Wi-Fi segmentation: The contractor shall coordinate SSID and associated VLANs with PCCD IT. Documentation of Wi-Fi SSID VLANs and address spaces shall be recorded by contractor.
5. D.	Management Addresses: Network Equipment management addresses must be coordinated by contractor with PCCD IT. Each manageable equipment shall be assigned a unique address for remote management. Equipment management address must be recorded within patching matrix.
5. E.	Management Accounts: Active network equipment deployed throughout the district has local and centralized access used to administer the equipment. These accounts have various privilege levels. Upon deployment of active network equipment, the management accounts must be secured by contractor to restrict unauthorized access. At a minimum, the management account passwords must be changed during commissioning. Password length and complexity must meet the districts password policies.
5. F.	Equipment Inventory: The network equipment inventory must be gathered by contractor at time of installation. The inventory information must include model number, serial number and deployed location. The inventory must be presented to the district within a spreadsheet and cross-checked with packing lists and purchase order.
5. G.	Topology Sketch: An as-built topology sketch showing network equipment interconnectivity, model numbers and location shall be developed by contractor and delivered to PCCD IT upon completion of installation
5. H.	Testing and Acceptance: The contractor shall develop and provide system testing details. Testing details and their results shall be provided to PCCD IT during equipment deployment.
5. I.	Packing Material Disposal: The contractor shall remove equipment packing material from project site. Coordinate disposal of material with PCCD IT and/or General Contractor.
5. J.	Maintenance and Support: The contractor shall coordinate maintenance contract requirements with PCCD IT. The contractor shall include required maintenance within Bill of Materials.
6.	**Monitoring Requirements:**
6. A.	Active network equipment administration for and monitors active network equipment. Network equipment must be integrated within the district monitor

	systems. Active network equipment includes but not limited to routers, switches, firewalls, and controllers used to transport network packets throughout the campuses and district
6.B.	Network monitoring will leverage SNMP architectures provided by enterprise grade equipment. The SNMP information will be collected by one or more existing monitoring engines such as SolarWinds or equivalent systems. Monitoring of equipment shall include the following at a minimum: a) Status up/down b) Environmental parameters such as temperature and power sources (if available) c) Component functionality such as blades, fans, supervisors d) Uplink interface status e) Uplink bandwidth utilization f) CPU utilization g) SNMP traps h) Syslog messages
7.	**CABLING REQUIREMENTS**
7. A.	Install, at a minimum, one (1) Category 6 cable from the nearest IDF/MDF room to the access point. All cabling shall conform to Peralta Community College District and EIA/TIA standards. At the MDF or IDF side, cable shall terminate in a dedicated rack mounted patch panel. At the access point end, provide 20 foot service loop for system fine tuning and potential future relocations.
7.B.	The network cable shall be installed, tested and District labeled EIA/TIA standards in the same manner as the “wired” LAN cabling infrastructure to District Standards.
7. C.	All network cables and face plates shall be clearly labeled according to district standards using clear and legible labels printed in 7-point Arial Font. Handwritten labels are not acceptable. Reference Datacom standards Section 27 30 00 for labeling convention.
8.	**WARRANTY**
8. A.	Manufacturer warranty is vendor specific and will be addressed after the manufacturer has been chosen.
8. B.	Contractor warranty on the cable and access point installation/workmanship shall be not less than 12 months from the time of system acceptance by Peralta Community College District.

Section 27 32 00 - TELECOMMUNICATION SYSTEM

0.	**General Requirements:**
0. A.	Peralta Community College District: Network and Wi-Fi Standards: a) Refer to PCCD: Network and Wi-Fi Standards for system guidelines.

1.	**General Technical Requirements:**
1. A.	Standards The design and installation shall comply with national standards, including but not limited to: 1. Telecommunications Industry Association (TIA): a) ANSI/TIA/EIA-568-B Commercial Building Telecommunications Cabling Standard; Part 1, Part 2, and Part 3, with addenda. b) ANSI/TIA/EIA-569-A Commercial Building Standard for Telecommunications Pathways and Spaces, with addenda. c) ANSI/TIA/EIA-606-A Administration Standard for the Telecommunications Infrastructure of Commercial Buildings. d) ANSI-J-STD-607-A Commercial Building Grounding and Bonding Requirements for Telecommunications.
1. A. 1.	*Underwriter's Laboratories (UL):* a) UL 444: Communications Cables b) UL 497: Protectors for Paired-Conductor Communication Circuits c) UL 1651: Optical Fiber Cable d) UL 1690: Data-Processing Cable e) UL 1963: Communications-Circuit Accessories f) UL 2024A: Optical Fiber Cable Routing Assemblies
1. A. 2.	*Insulated Cable Engineers Association (ICEA):* a) ANSI/ICEA S-83-596-1994 Fiber Optic Premises Distribution Cable b) ANSI/ICEA S-87-640-1999 Fiber Optic Outside Plant Communications Cable c) ICEA S-104-696-2001 Standard For Indoor-Outdoor Optical Cable d) Category 6 Individually Unshielded Twisted Pair Indoor Cable for Use In General Purpose and LAN Communication Wiring Systems.
2.	**Telecommunication System Cabling:**
2. A.	System includes:
2. A. 1.	Data cabling system: Fiber optic and CAT 6 or higher
2. A. 2.	Voice cabling system. Fiber Optic, Copper, CAT 6 or higher wires mix or VOIP.
2. A. 3.	CATV cabling system.
2. B.	Communications Infrastructure Scaling Guidelines

2. B. 1.	Spaces and requirements are to be defined in terms of High, Medium, Small Load and Isolated Rooms. These definitions are used in elsewhere in this design standard to establish quantitative design goals.
2. B. 2.	High Load. A building or group of buildings connected above ground, served out of one MDF and having one or more of the following conditions:
2. B. 2. a.	More than fifteen classrooms or more than 50 office occupants, or combinations approaching these.
2. B. 2. b.	Computer Lab
2. B. 2. c.	Media Center
2. B. 2. d.	Television Studio
2. B. 2. d.	Major program or Student Services
2. B. 3.	Medium Load. A building or group of buildings connected above ground, served out of one MDF and having five to 15 normal use classrooms or 15 to 49 office occupants, or a combination approaching these or a (DS) IDF
2. B. 4.	Small Load. A building or group of buildings connected above ground, served out of one MDF and having one to four normal use classrooms, 5 to 14 office occupants, or combinations approaching these.
2. B. 5.	Isolated Room. Typically a re-locatable, an Isolated Room is one wherein a single classroom or office with fewer than 5 occupants has no above ground connection to adjacent buildings. Where other factors do not predominate (i.e. existing conditions, constrained site), these conditions should be avoided because the cost of communications service to such spaces is significantly higher on a cost per served student/staff ratio. Connect All.
2. C.	Provide a complete data distribution cabling system installation.
2. C. 1.	System shall include the following:
2. C. 1. a.	All projects shall use Category 6 cabling where new cable runs are installed. Cable must be plenum-rated regardless of installation location. Not to exceed 300 meters.
2. C. 1. b.	All cabling and passive network equipment must be per District's IT Standards.
2. C. 1. c.	All passive network components (wall jacks, punch blocks, etc) shall be Category 6 compliant.
2. C. 1. d.	All projects require clear, legible labeling of fiber optic cable, cables and jacks using printed (not hand-written) labels, to District standard coding. Jack numbers to be coordinated with the District's IT department.
2. C. 1. e.	All cabling and passive network equipment is supplied by the Third Party as needed. A list of parts shall be provided for review to District IT.
2. C. 1. f.	All projects require termination of all fiber optic and cable runs. A cable run consists of a single cable, terminated at both ends. In MDF/IDF terminate into rack-mounted patch panels. In Work Areas (offices), terminate into 4-port faceplates.

2. C. 1. g.	Cable runs and terminations shall be clean, organized/bundled, and physically secured, using appropriate cable management hardware. All copper terminations shall be compliant with the T568B specifications.
2. C. 1. h.	Fiber optic cable intertie of main distribution facility (MDF) with intermediate distribution facilities (IDF's) in a star configuration – each IDF connects directly to the MDF and does not require an intermediate patch at any other point.
2. C. 1. i.	Fiber optic cable terminates at rack mounted patch panels at MDF with patch cord management placed above and below. At MDF/IDF's provide patch panels at full height (44 RU) racks in secure locations. Provide fiber terminal boxes at back (fixed section) of swinging racks where used.
2. C. 1. i. i.	Patch cord cable and connector assembly shall be the same manufacturer as the specified fiber optic cable and connector. Patch cord shall be factory assembled and tested, 50 micron multimode duplex MTR. Length shall be minimum 1 meter.
2. C. 1. i. ii.	Patch panel shall be modular, rack mount with removable back cover and cable strain relief brackets, anodized aluminum finish. Panel size in rack units shall be based on projected fiber strand capacity. A minimum of 25% extra capacity for future expansion shall be provided.
2. C. 1. j.	Combination panel shelves interface with routing/switching equipment at MDF and each IDF via Owner furnished fiber patch cords.
2. C. 1. k.	District fiber jack standard is small form factor type MTRJ as manufactured by AMP, Corning Cable Systems, Hubbell, Leviton, Siemon and others, which terminates two strands in the space of a single RJ45 copper termination.
2. C. 1. l.	Multimode standard strands to be: 62.5/125 micron, bandwidth:
2. C. 1. l. i.	850 nm, LED based sources, Min OFL BW of 200 MHz at 1 km
2. C. 1. l. ii.	850 nm, Laser based sources, Min RML BW of 220 MHZ at 1 km
2. C. 1. l. iii.	1300 nm, Min OFL BW of 500 MHz at 1 km
2. C. 1. m.	Station Cabling Termination:
2. C. 1. m. i.	Cat 6 or higher cabling 24 port & 48 port, 19" rack mountable patch panels with modular 8-pin connector front for interface with OFE routers/switches and /110 type terminations at rear for station cable termination on back.
2. C. 1. m. ii.	Wire management provided above and below each patch panel, 2 RU for each 48 port patch panel unless using wire management placed in front of patch panel at base.
2. C. 1. n.	Category 6 or higher, 4-pair, UTP, plenum rated station cables throughout from MDF or IDF's to computer station outlet (quad outlet). Each service to a computer station outlet shall consist of three cables and shall be considered a cable service drop.
2. C. 1. o.	Plates: Defined as three Cat 6 or higher RJ-45 jacks terminated on a common single gang wall plate, common open plan furniture knockout cover or in-line

<table>
<tr><td></td><td>raceway plate provided at large cross- sectional area surface raceway. Plate standard includes voice jack allowance in 4 jack standard.</td></tr>
<tr><td>2. C. 1. p.</td><td>Drops: Defined as a jack (Cat cabling RJ45). Drop locations shall contain 4 data jacks mounted in a single 4-port faceplate. One 4-port faceplate will be installed per work area. 4 data jacks.</td></tr>
<tr><td>2. C. 2.</td><td>Racks and cabinet</td></tr>
<tr><td>2. C. 2. a.</td><td>Racks within telecommunications rooms will be furnished by PCCD IT department for the network equipment to be installed within. Obtain racks from PCCD IT rack space location for intended equipment.</td></tr>
<tr><td>2. C. 2. b.</td><td>MDF – each site. A minimum of five (5), floor mounted (bolted) four post EIA 19” wide, 444RF (1 RU=1.75”) 36” server racks each with full height adjustable EIA treaded mounting rails, full height 20A power strips (Wiremold 7011ULBC20), 2-20A dedicated circuits each rack, full height 4 square inch vertical cable management to each side of EIA mount rails. Provide UPS emergency power back-up system. Spaces to be air conditioned.</td></tr>
<tr><td>2. C. 2. b. i.</td><td>Terminate no station cabling at 4 post racks.</td></tr>
<tr><td>2. C. 2. c.</td><td>Large and Medium IDF’s, (and at MDF to terminate adjacent station cabling and site fiber patch panels): Full height, 44 RU min. deep section 19” EIA relay rack power strips (Wiremold 7011ULBC15), 1-20A dedicated circuit each rack. Provide equivalent to CPI CatRack, AFCO, Hubbell, DataTel, Ortronics. Provide UPS emergency power back-up system.</td></tr>
<tr><td>2. C. 2. c. i.</td><td>Terminate a maximum of 144 ports of copper service in any single relay rack to provide room in the rack for electronics, UPS, addtl. Patch management and expansion/service.</td></tr>
<tr><td>2. C. 2. d.</td><td>Small and Isolated IDF for 48 station ports and fewer – Three section swing rack assembly, 17” min depth for equipment mount with fiber terminal box installed on wall inside fixed section. Hubbell, AFCO, Atlas 340 series. Provide 1 – 20A dedicated circuit each rack.</td></tr>
<tr><td>2. C. 2. e.</td><td>Size floor area to accommodate 30” minimum clearance behind racks and 36” clear in front of racks. Assume worst case protrusion of relay rack wire management at front, assume 18” deep equipment mounted in relay rack rails when calculating rear clearance.</td></tr>
<tr><td>2. C. 2. e.</td><td>Based on the above, the following IDF closet sizes are implied based on rack dimensions alone:
<table>
<tr><th rowspan="2">Number of Racks</th><th colspan="2">Racks are Side By Side</th><th colspan="2">Racks are against one wall</th></tr>
<tr><td>Room Width (ft)</td><td>Room Depth (ft)</td><td>Room Width (ft)</td><td>Room Depth (ft)</td></tr>
<tr><td>1</td><td>6</td><td>8</td><td>6</td><td>8</td></tr>
<tr><td>2</td><td>8</td><td>8</td><td>6</td><td>13</td></tr>
<tr><td>3</td><td>11</td><td>8</td><td>6</td><td>18</td></tr>
<tr><td>4</td><td>13</td><td>8</td><td>6</td><td>23</td></tr>
</table></td></tr>
</table>

2. C. 2. f.	Allow for 6” min. depth terminal block and/or conduit entrances where they occur and add to sizes shown above.
2. C. 3.	Provide station cabling service drops at a minimum as follows:
2. C. 3. a.	Telecommunications designer shall prove drops as required per Site Survey for WLAN Deployment to provide continuous coverage though out staff an student use areas inside and outside of the work.
2. C. 3. b.	Classrooms: 8 drops.
2. C. 3. c.	Computer lab classrooms: To match floor plan design density plus 20% for printers, presenters, 2 wireless access point, presenters, lab servers and growth.
2. C. 3. d.	Administration area: 4 jacks at each desk and counter space. (2) 4 jacks each private office, typically at opposite walls perpendicular to window.
2. C. 3. e.	Library: Allow 24 - 32 jacks min, plus 4 jacks at ceiling level for future wireless transmission. Provide plates at library offices equivalent to administration space above.
2. C. 3. f.	Auditorium: (3) 2 jacks in stage floor box, 4 jacks at each wall. In ceiling for intelligent classroom connection of projection Devices.
2. C. 3. g.	Multipurpose room: 2 jacks at each wall, plus locations required for WAPs.
2. C. 3. h.	Locker room office: 4 jacks each desk, 2 jacks all other wall.
2. C. 3. i.	Teacher and staff work area: (2) 4 Jacks at each desk, 2 jacks all other wall.
2. C. 3. j.	Kitchen Teaching Laboratory: (9) 4 jacks(8 at serving station)

Section 27 53 13 - MASTER CLOCK SYSTEM

1.	**Master Clock System:**
1. A.	System includes:
1. A. 1.	Wireless clock system.
1. B.	Provide a microprocessor based programmable, automatic correcting, master time system, complete with system controller, booster/power supplies, indicating clocks and all associated conduit, wire, boxes, supports, etc. Alternately, provide master clock controller to operate passing bells and provide radio synchronized battery clocks.
1. C.	Manufacturers:
1. C. 1.	Clock system, wire synchronized
1. C. 2.	Radio Synchronized Battery Clocks
1. D.	Clock system shall consist of the following:
1. D. 1.	GPS Receiver

1. D. 2.	Primary Transmitter
1. D. 3.	Satellite Transmitter
1. D. 4.	Wireless Tone Generator:
1. D. 4. a.	9 volt switching power supply.
1. D. 4. b.	16 selectable channels and 25 switch id codes.
1. D. 4. c.	Minimum 8 schedules, 96 programmable events with 7 day selectable operations.
1. D. 4. d.	Switching information stored in non-volatile memory in the transmitter.
1. D. 5.	Software based scheduler programming.
1. D. 6.	Analog clocks shall be 12 1/2" diameter except at gym and multipurpose areas where 24" diameter clock shall be used. Clock shall battery operated with 5 years battery life, automatically adjusting for daylight saving time.
1. D. 7.	Where new clocks and speakers are provided, clock shall be integrated under a combination clock/speaker grille for all interior applications where both occur in the same area. Provide clock size and construction where appropriate for school functions and nominal viewing distance, including cage protection at gyms.

Division 28 – Electrical Safety and Security

Section 28 10 00 - SECURITY SYSTEM

1.	**Security System:**
1. A.	System description: Provide a complete and operable Security System, including but not limited to:
1. A. 1.	Passive infrared detectors "PIR".
1. A. 2.	Door position-monitoring system.
1. A. 3.	Digital keypad arming/disarming stations.
1. B.	Component and device locations:
1. B. 1.	PIR detection devices shall be located in the following interior spaces:
1. B. 1. a.	Each classroom with exterior window wall at ground level.
1. B. 1. b.	Classrooms with large quantities of computer and electronics equipment.
1. B. 1. c.	Administration spaces with exterior window wall exposure at ground level.
1. B. 1. d.	Library space.
1. B. 1. e.	MPOE/MDF room.
1. B. 1. f.	IDF closets.
1. B. 2.	Door position monitor contacts:

1. B. 2. a.	Flush mounted door alarm contacts will be provided for all exterior doors.
1. B. 2. b.	Surface mounted door alarm contacts will be provided for the following doors:
1. B. 2. b. i.	Roof hatches in each building.
1. B. 2. b. ii.	Motorized roll-up exterior doors.
1. B. 3.	Digital keypads:
1. B. 3. a.	Keypads are required to arm and disarm the alarm system for each zone within the system.
1. B. 3. b.	A digital keypad shall be provided at a single entrance point to each building. Generally, the keypads are located on the interior just inside a main entry door so as not to be exposed to vandalism. Keypads are zoned per building or per function within each building.

Section 28 46 21 - FIRE ALARM SYSTEM

1.	**Fire Alarm System:**
1. A.	System includes:
1. A. 1.	Fire alarm control panel.
1. A. 2.	Initiation devices.
1. A. 3.	Notification devices.
1. A. 4.	Remote annunciator panels. Simplex 4100U
1. A. 5.	Fire alarm auxiliary equipment control.
1. A. 6.	Record drawings.
1. B.	**System description**
1. B. 1.	The fire alarm system shall be zoned and addressable. It shall be 24 VDC closed circuit, electronically supervised, horn evacuation, device indicating, auxiliary control system, automatic alarm type, smoke detectors, heat detectors and sprinkler system switches, with a manual pull station for operation. System manufacturer shall be Simplex.
1. B. 2.	The fire alarm system shall comply with requirements of NFPA 72 for protected premises signaling systems. The system shall be electrically supervised and monitor the integrity of all conductors.
1. C.	**Fire alarm system equipment:**
1. C. 1.	Control and annunciation panel, which controls and monitors all of the system devices. Control panel will include initiating/annunciating modules, power supplies, batteries, and remote station transmitter.
1. C. 2.	Initiating devices:
1. C. 2. a.	One addressable manual pull station located in administration office:

1. C. 2. a. i.	Addressable Manual Station shall be provided to connect the Fire Alarm Control Panel Signaling Line Circuit (SLC) Loops.
1. C. 2. a. ii.	Manual operated station shall have a positive, visual indication of operation that cannot be reset without the use of a key.
1. C. 2. a. iii.	Station shall be suitable for surface mounting, or semi-flush mounting as shown on the plans, and shall be installed at 48 inches above the finished floors.
1. C. 2. b.	**Addressable smoke detectors:**
1. C. 2. b. i.	The area smoke detectors shall connect with two (2) wires to the fire alarm control panel signaling line circuit loop. The detectors shall use the photoelectric principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the level of smoke density. The sensors shall be low profile, ceiling mount with a twist-lock base and shall provide a test means that will simulate an alarm condition and report that condition to the control panel. Sensors shall be individually programmable for Alarm Verification, Pre-Alarm indication, LED blink and automatic Day/Night Sensitive shift; and compensate for environmental fluctuations.
1. C. 2. c.	**Addressable Duct Smoke Sensor Housing:**
1. C. 2. c. i.	Provide and install where shown on plans duct smoke sensor housing which can be either multi-sensor type analog/addressable detectors. Each housing shall be installed with properly sized air sampling tubes and remote indicators or remote test switches wherever called for on the plans.
1. C. 2. d.	**Addressable heat detectors:**
1. C. 2. d. i.	Heat sensors shall connect with two (2) wires to the fire alarm control panel signaling line circuit loops. The detectors shall use an electronic sensor to measure thermal conditions caused by a fire and shall, on command from the control panel, send data to the panel representing the analog level of thermal measurements. The sensors shall be ceiling mount with a twist-lock base and shall provide a test means that will simulate an alarm condition and report that condition to the control panel. This test may be initiated at the sensor itself by activation of a magnetic switch or may be activated on command from the control panel.
1. C. 2. e.	Sprinkler system: Monitoring devices will be installed by the fire protection contractor on the sprinkler system water piping and will be connected to the fire alarm system by the electrical contractor. There are two types of devices that initiate two different responses, a "Trouble" condition or an "Alarm" condition:
1. C. 2. e. i.	Trouble condition: This condition will occur if any valves in the sprinkler system are closed. The normal condition is that they are always in the open position. This condition will annunciate at the control panel and automatically notify the remote monitoring station.
1. C. 2. e. ii.	Alarm condition: This condition will occur if there is any water flow in the sprinkler system, either due to a leak of the activation of a sprinkler head. This condition will annunciate at the control panel, activate the horn/strobe devices throughout the system, release the door hold open/release devices and automatically notify the

	remote monitoring station.
1. C. 2. e. iii.	Water flow switch locations: These devices will be installed by the fire protection contractor on the sprinkler risers. The tap to each floor will include one of these devices to annunciate the activation of a sprinkler head or a leak in the system on that respective floor.
1. C. 2. e. iv.	Tamper valve switch locations: These devices are installed on all of the valves in the sprinkler system. These typically only occur adjacent to the water floor switches.
1I. C. 2. e. v.	PIV location: This switch is mounted on the red post outside at the campus service point. It's purpose is the same as the other tamper valve switches except that is mounted on the main sprinkler water valve that serves the entire building.
1. C. 3.	**Fire alarm notification system:**
1. C. 3. a.	Fire alarm function overview: Combination horn/strobe, (audio/visual) devices will be installed to allow them to be easily heard throughout the buildings. The operation of these devices will occur upon activation of any smoke detector, heat detector, or the manual pull station.
1. C. 3. b.	Shall meet the requirements of the ADA and UL1971.
1. C. 3. b. i.	The maximum pulse duration shall be 2/10ths of one second.
1. C. 3. b. ii.	Intensity shall be as specified on the drawings.
1. C. 3. b. iii.	The flash rate shall not exceed two flashes per second and no less than one flash per second.
1. C. 3. b. iv.	Candela rating shall be as required per each space, and shall not be less than 15 candela.
1. C. 3. b. v.	Visual devices within fifty-five (55) feet of each other shall flash in synchronicity with each other.
1. C. 3. b. vi.	The appliance shall be placed 80 inches to bottom of device or 96 inches (max) from top of lens.
1. C. 3. b. vii.	Audible and visible devices shall operate on separate circuits.
1. C. 3. b. viii.	Sound pressure rating for each audible device shall be as required per each space, to exceed average ambient sound level by 15 decibels or five decibels above the maximum sound level in each room. .
1. C. 3. b. ix.	Audible devices shall be synchronized to a temporal code three pattern as defined by ISO 8201 and ANSI / ASA S3.41.
1. C. 4.	**fire alarm notification devices:**
1. C. 4. a.	Mini-horn devices shall be installed in the following areas:
1. C. 4. a. i.	Each classroom.
1. C. 4. b.	Strobe only devices shall be installed in the following areas:

1. C. 4. b. i.	Restrooms.
1. C. 4. b. ii.	Electrical/telecommunication rooms.
1. C. 4. c.	Alarm zones: The audio/visual notification devices shall be zoned as follows:
1. C. 4. c. i.	One all zone.
1. C. 4. c. ii.	One zone per building.
1. C. 4. c. iii.	One zone per floor.
1. C. 5.	**Other fire alarm devices:**
1. C. 5. a.	Provide smoke detectors in lobby.
1. C. 5. b.	Provide microphones associated with the Emergency Voice Alarm Communication System (EVAC) at each fire alarm panel and in administration office.
1. C. 5. c.	Elevator controller(s): Provide a pair of wires from a set of dry contacts in the control panel or remote mounted programmable relays to elevator controller(s) for elevator recall to ground floor.
1. C. 5. d.	Door hold-open/closure devices: Provide a pair of wires from a set of dry contacts in the control panel or remote mounted programmable relays to each door hold-open/closure device for power to and release of doors.
1. C. 5. e.	Roll-down fire doors and shutters: Provide a pair of wires from a set of dry contacts in the control panel or remote mounted programmable relays to each roll-down fire door or shutter for release of door.
1. C. 5. f.	Fire/smoke dampers: Provide a pair of wires from a set of dry contacts in the FACP or remote mounted programmable relays to each smoke damper for automatic closure of dampers. Also provide a hand-off-auto in FACP for manual control of dampers with LED lights to indicate when each damper is opened or closed. Additional wiring is required to each damper limit switch to monitor open or closed status.
1. C. 6.	Remote monitoring station: The following summary alarm conditions will be transmitted to a UL approved remote monitoring station facility via leased telephone lines:
1. C. 6. a.	Smoke detection system alarms.
1. C. 6. b.	Sprinkler flow alarm.
1. C. 6. c.	Activation of administrations manual pull station.
1. C. 6. d.	Trouble.
1. C. 7.	Batteries:
1. C. 7. a.	Shall be 24V sealed lead acid up to 80 AH type.
1. C. 7. b.	Shall have sufficient capacity to power the fire alarm system for not less than twenty four hours of standby operation plus an addition fifteen minutes for EVAC alarm

	power needs (batteries) Simplex 4009 is an extender of alarm upon a normal AC power failure.
1. D.	**Warranty**
1. D. 1.	Contractor shall warrant completed fire alarm system wiring and equipment to be free from inherent mechanical and electrical defects, for a period of one year from date of completed and certified test, or from date of first beneficial use.
1. D. 2.	System manufacturer shall include an agreement whereby system will be inspected and tested in accordance with NFPA-72, Chapter 7. Testing shall be conducted by a local factory trained technician, who will upon completion of testing, provide the District with written records of testing. This agreement shall be in effect for a period for two years after initial testing and acceptance by the district. Cost of such agreement shall be par of Contractor's bid.
1. E.	**Extra Materials**
1. E. 1.	Provide five percent (5%) manual stations of each type (minimum of one for each type) and pull station rods.
1. E. 2.	Provide six keys of each type. Panel installed.
1. E. 3.	Provide five percent (5%) of each type of smoke and heat (minimum of one of each type) detector.
1. E. 4.	Provide five percent (5%) of each type of audible and visual alarm device (minimum of one of each type).
1. F.	**Testing**
1. F. 1.	General testing requirements
1. F. 1. a.	Provide all instruments for testing and demonstrating in the presence of the owner's inspector that the frequency response is as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds.
1. F. 1. b.	System shall be complete and properly operating prior to calling for the test. The inspector, contractor and engineer shall walk test system at district's option and contractor shall make minor satisfactory adjustments to the system in the presence of the inspector. Contractor shall coordinate the time of test with the district inspector. This test shall be performed during a time when there are no other persons on the site.
1. F. 1. c.	Provide two portable radio transceivers to be used when walk testing the system. The transceivers shall be capable of communication throughout the entire site.
1. F. 2.	Specific system testing requirements
1. F. 2. a.	Contractor shall provide all DSA required testing and certification at no cost to the Owner.
1. F. 2. b.	Contractor to contact the local fire authority to give them the opportunity to attend the final system test, which shall also be attended by the project's Inspector of

	Record. Contractor to provide documentation to District of entire testing procedures and testing results.
1. F. 3.	**Final acceptance**
1. F. 3. a.	The Owner or Owner's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.
1. F. 3. b.	The Owner or Owner's representative will conduct a final job review once the contractor has finished the job. This review will take place within one week after the contractor notifies the owner.
1. F. 3. c.	Three copies of all certification data and drawings for all identifications shall be provided to the Owner before the owner's review.
1. F. 3. d.	The Owner or Owner's representative will review the installation and certification data prior to the system acceptance. Three copies of manuals, drawings and electronic versions.

Per CSI Master Format Divisions 29 & 30 are Not Used.

Division 31 – Earthwork: The District has not standardized this sections.

Division 32 – Exterior Improvements

Section 32 33 13 – SITE BICYCLE RACKS

1.	Bicycle racks should be provided in the area adjacent to public entrances (location to be approved by district no later than 50% CD's) of new and modernized buildings.
2.	Based on project specific conditions bicycle racks shall allow for a minimum of five (5) bikes per rack minimum and nine (9) bikes per rack maximum. Multiple racks should be installed in each location, to provide adequate bike parking capacity for the anticipated use based on occupancy of the building.
3.	Bicycle racks shall be Wave Style Bike Rack. Made from schedule 40 pipe - 2 3/8" outside diameter hot dip galvanized tube steel. With embedded mounting studs
4.	Installation: Epoxy grout Bicycle rack pipes into sidewalk with minimum 10" embedment. top of rack shall not exceed thirty-six (36") inches in height and shall not be lower than thirty-three (33") inches. Surface mounted base plates are not acceptable in lieu of embedment.

Section 32 33 23 – SITE TRASH AND RECYCLEING RECEPTACLES

1.	Site trash and recycling shall be installed in pairs near seating areas and building entrances.

2.	**Receptacle:** **Size:** Twenty-five (25) inch diameter, thirty-four (34) inches in height **Lid:** Dome type lid **Assembly:** Receptable bin shall be attached to inground mounting post with stainless steel hardware. **Finish:** Factory applied marine grade powder coat finish, trash and recycling receptables should be distinctly different in color; color shall be approved by district. **Height Above Finished Grade:** Top of receptacle not to exceed forty (40) inches above finished grade, bottom of receptacle shall be mounted six (6) inches above finished grade. **Foundation:** eight (8) inch diameter x twenty-eight (28) inch deep footing with inground mounted post embedded seventeen (17) inches.

Section 32 39 13 – MANUFACTURED METAL BOLLARDS

1.	Bollards shall be used for pedestrian protection where required to prohibit or restrict vehicular access. The use of fixed or removable bollards shall be at the discretion of the district. Note: this section does not cover Vehicle Barriers as defined by the CBC.
2.	**Fixed Bollards:** **Pipe Size:** three point five (3.5) – four point five (4.5) inches outside diameter. **Cap:** Round. **Finish:** Factory applied marine grade powder coat finish, color should be easily visible in daylight and night, color shall be approved by district. **Height Above Finished Grade:** Thirty-Six inches (36”). **Foundation:** Thirty-three (33) inches concrete footing twelve (12) inches in diameter.
3.	**Removable Bollards:** **Pipe Size:** three point five (3.5) – four point five (4.5) inches outside diameter. **Weight:** not to exceed forty (40) pounds **Cap:** Round. **Finish:** Factory applied marine grade powder coat finish, color should be easily visible in daylight and night, color shall be approved by district. **Height Above Finished Grade:** Thirty-Six inches (36”). **Foundation:** Thirty-three (33) inches concrete footing twelve (12) inches in diameter. **Key and Lock:** Padlock to be provided by owner.

Section 32 80 00 - LANDSCAPE IRRIGATION SYSTEM CRITERIA

1.	Irrigation shall meet the EBMUD non-potable water requirements, for landscaping that is not in direct contact with student circulation or recreation.
2.	Provide separate water meters from the school site for irrigation of play fields.
3.	All new turf and lawn valves shall be centrally located at the edge of the turf closest to the irrigation timer.

4.	Sprinkler heads and timers shall be standardized.
4. A.	Acceptable Manufacturers:
4. A. 1.	Rainbird or Toro; or district approved equal.
5.	Timers shall be placed in a central location and wires for telephone modem shall be installed prior to installation of timers.
6.	Irrigation to shrubs in raised planters shall be low-volume drip type; shrub heads for ground cover and bubblers at all tree locations.
7.	Provide polyvinyl chloride (PVC) pipe sleeves for controller wires where they cross under hard surfaces, such as concrete, asphalt concrete paving, etc.
8.	Provide one (1) empty, two- (2) inch diameter, conduit chase pipe and pull string for future use at all locations where pipe sleeves for controller wires have been installed.
9.	All irrigation systems shall be equipped with backflow preventers.

Division 33 – Utilities

Section 33 51 00 - GAS DESIGN CRITERIA

1.	**GAS PIPING**
1. A.	Gas piping shall be SDR 17 polyethylene, or Schedule 40 black. Underground gas lines shall be wrapped to the specifications required by applicable Code and the City of Oakland, Alameda, or Berkeley. Provide plastic PE piping underground outside buildings; steel pipe shall not be used underground. Site gas piping below grade: polyethylene with ASTM D2513, ASTM D3261, and ASTM D2683 fittings with fusion welded joints. Pipe shall be labeled “for natural gas” in accordance with CPC. Gas meters to be hardwired for remote monitoring with District’s Energy Management System (EMS).
2.	**METER LOCATION REQUIREMENTS FOR SCHOOLS**
2. A.	Meters are to be installed in a wire cage or other suitable protective enclosures to protect from vandalism. The enclosure must be able to be secured with a PG&E lock. Alternative protective means must be approved by PG&E. The enclosure shall be used only for PG&E metering and service equipment. Typical enclosure dimensions are determined by PG&E.
3.	**SERVICE PIPE**
3. A.	Gas service pipe installations are constructed according to the provisions of Gas Rule 16, “Gas Service Extensions,” as authorized by the California Public Utilities Commission (CPUC). In every case an automatic gas shut off valve to be provided at the gas main connection.
3. B.	When paving around the gas service riser, provide an opening or free space in the paving for riser. The opening is to be a minimum of 3 inches in diameter, unless otherwise specified by PG&E.

3. B.1	Gas piping depths must be installed and sleeved per PG&E standards, for gas piping under walkways, roadways or any paved areas.
3. C.	Excess flow valves shall be installed on all new and replaced gas services that meet the following criteria:
3. C. 1.	The system pressure does not drop below 10 pounds per square inch gauge (psig).
3. C. 2.	The service is not a branch service or a service with a branch off of it.
3. C. 3.	The entire service is to be replaced. Install pipe sleeve at all penetrations of black top.
3. C. 4.	The service replacement is part of an engineered job.
3. D.	Excess flow valves are installed in compliance with U.S. Department of Transportation requirements.
3. E.	Meter locations for branched services are usually on the sides of the buildings that are adjacent to each other.
3. F.	Provide gas pressure regulator from the gas main pipe to branch service as per PG&E.
3. G.	Asbestos cement pipe shall not be allowed under any circumstances.
4.	**JOINT TRENCHES**
4. A.	Gas service pipes and electric service laterals may be installed in a common joint trench. The joint trench can include telephone and cable television facilities. Water piping is not permitted in the trench. PG&E may consider exceptions upon the submittal of a written request. Sewer, sanitary or storm drain piping or facilities are not permitted in a joint trench.
4. B.	Trench details must be submitted to PG&E for review and approval.
5.	**LABORATORY GAS PIPING**
5. A.	Piping shall be sized to meet the demand.
5.A.1	Provide isolation valves at all branch runs for future maintenance.
5. B.	Laboratory piping shall be sized using a diversity factor of 0.5. The distribution piping feeding the laboratory shall be sized using a diversity factor of 1.0. The minimum branch size for gas lines is ½ inch.

Section 33 52 16 - GAS PIPING

1.	**General Criteria:**
1. A.	Gas pipe routing shall avoid underground routing, where necessary pipe shall be indicated as follows:
1. A. 1.	In general, underground gas pipe material shall be as follows;

1. A. 1. a.	P.E. Polyethylene pipe for longer runs from the meter to the building and for longer runs within the campus where “self help” digging is unlikely to occur.
1. A. 1. b.	Other than above, underground gas piping shall be steel pipe, wrapped w/ cathodic protection.
1. A. 1. c.	All locations of plastic and steel pipe shall be reviewed by the District and approval of the design obtained in writing before the project is bid.
1. A. 1. d.	Where different gas pipe material is necessary on the same project, location of each pipe type must be clearly indicated on the drawings.
1. A. 1. e.	Gas pipe to be routed under canopies and building overhangs where possible and not too low. Where not possible or desirable, route on roof.
1. A. 1. f.	If gas pipe is to be routed on roof, use minimum number of seismic anchors with floating pipe supports between designed to comply with CBC 1632. Pipe supports and pipe layout to be designed to account for gas pipe expansion.
1. A. 1. g.	Provide new seismic gas safety valve on all main services such that a single seismic valve serves the entire campus.
1. A. 1. h.	Gas distribution should be medium pressure where available with a regulator provided at each building.
1. A. 1. i.	Building gas shut off valves shall not be designed to be below grade.
1. A. 1. j.	All gas regulators shall be located above grade held as high as practical in a remote location.
1. A. 1. k.	Gas pipe sizing: Each gas pipe in the system shall be sized to accommodate a gas load of a minimum of 15% greater than the current design load. If the meter is to be changed as part of the modernization project, it does not have to be designed to accommodate this load.
1. A. 1. l.	Gas meters shall be a register meter with digital output, enclosed with chain link fencing to meet Utility Company requirements and shall also be connected to EMS.
2.	**Gas Piping:**
2. A. 1.	Concealed gas piping within the building shall be Schedule 40 black steel pipe conforming to ASTM A-53 using 150 pound banded malleable iron screwed fittings for piping 2” and smaller and weld type steel fittings for piping 2-1/2” and larger.
2. A. 1. b.	Exposed gas piping outside the building shall be Schedule 40 galvanized steel pipe conforming to ASTM A-53 using galvanized 150 pound banded galvanized malleable iron screwed fittings for piping in sizes 2” and smaller and seamless weld type steel fittings for all piping sizes 2-1/2” and larger.
2. A. 1. c.	Underground gas piping shall be SDR-11 Polyethylene PE2406 (Yellow) as manufactured by Driscoplex. Fittings shall be socket fusion weld Polyethylene as manufactured by Performance Pipe or Central, PE2406 (yellow) complying with ASTM, D2513. Where required provide “Lyco” or Double “O” seal transition fittings between steel and polyethylene as manufactured by Central, all identified and

	approved for gas service. A 14 gauge copper tracer wire shall be installed with and caution burial tape – GAS attached to piping and shall terminate above grade at each end; buried pipe to have caution tape – GAS installed as well.
2. B.	Minimize main branch lines supplying remote building. Branches to remote buildings shall be combined where practical. Avoid redundant pipe runs back to header at meter.

Division 34 – Transportation: The District has not standardized these sections.

Division 35 – Marine Construction: The District has not standardized these sections.

Per CSI Master Format Divisions 36-39 are Not Used.

Division 40 – Process Integration: The District has not standardized these sections.

Division 41 – Material Processing: The District has not standardized these sections.

Division 42 – Process Heating, Cooling, and Drying Equipment: The District has not standardized these sections.

Division 43 – Process Gas & Liquid Handling: The District has not standardized these sections.

Division 44 – Pollution and Waste Control Equipment: The District has not standardized these sections.

Division 45 – Manufacturing Equipment: The District has not standardized these sections.

Division 46 – Water and Wastewater Equipment: The District has not standardized these sections.

Per CSI Master Format Divisions 47 is Not Used.

Division 48 – Electrical Power Generation: The District has not standardized these sections.

Per CSI Master Format Divisions 49 is Not Used.

IV. GENERAL DESIGN CRITERIA

1. The Architect/ Engineer shall determine the Construction Type based on the requirements of the **current** California Building Code (CBC). New buildings or additions shall be no less restrictive than Type III construction as defined by Chapter 6 of the **2019** California Building Code. This requirement does not preclude a more restrictive construction type in order to achieve code compliance.

2. A certification by the sustainable building industry - U.S. Green Building Council of LEED Silver to be required for new construction projects, and as determined by the District.

3. All new landscape planting shall be draught resistant native California species.

4. Provide adequate access to mechanical spaces and equipment (ceilings and other areas). Access shall allow for moving and servicing of equipment without modification of the access entrance (i.e. removing doors, panels, etc.)

5. Cement backer board shall be used in “high traffic” and “hard-wear” ceramic tile areas (i.e., student toilet rooms, corridors, stairways, gymnasium locker rooms, exercise rooms).

6. New walls should be acoustically treated with consideration for noise levels of each activity and adjacent spaces. Design new walls between classrooms for a forty (40) **STC (sound transmission class)** rating.

7. In all wet or moisture producing areas where gypsum wall board is used, it shall be **moisture and mold resistant** gypsum wall board.

8. All rooftop HVAC equipment, except small exhaust fans, shall be architecturally screened from view.

9. All “wet” room renovations (where possible), i.e.: new toilet rooms, locker & shower rooms shall have a hose bibb, sloped floors to drain with a seamless, waterproof membrane below finished floor and extending six (6) inches up walls.

10. At all new and, where possible, existing Janitor Rooms; provide storage shelves, mop rack and floor mounted service sinks. Area above mop sink shall have FRP Board wainscot. Custodial areas and sanitary facilities shall have powered exhaust fans and smoke and draft controlled type louvered doors.

11. The Architect shall provide a Master Mounting Height Schedule to include but not limited to; toilet fixtures and accessories, electrical outlets, data, telephone, equipment etc.

V. STANDARD CLASSROOM STANDARDS

General Note: Since several classrooms will be constructed in new facilities or retrofitted from existing spaces, a district specification standard is important to refer to when establishing designs. Whenever possible these specifications should be considered when modernizing existing classrooms. The design within the classroom is critical to maintaining an educational environment conducive to learning. The following specifications should be considered when designing classrooms:

DESIGN SPECIFICATIONS

1.	**Visual Display and Technology**
1. A.	General Criteria
1. A. 1.	The large group activities, directed by the teacher, often use overhead projectors or a LCD/data projector with screen display.
1. A. 2.	Faculty and students use marker/chalk board on one wall for practice of their skills and as an instructional tool. The height of the boards should be comfortable for both students and Faculty.
1. A. 3.	Faculty will also be able to directly connect his or her computer to the projector or television monitor in the room from the teacher workstation. The TV monitor is connected to a centralized/automated A/V distribution system from the media center. Video conferencing with exterior jack hook-up is available through ISDN line.
2.	**Active Learning Classrooms**
2. A.	General Criteria
2. A. 1.	Active Learning Classrooms will be conducted with students assembled into various groups within a classroom. Many walls will have different electronic capabilities pursuant to the District's "Smart Classroom" Standard. Operable walls or doors between some classrooms allow students and Faculty to move between rooms and provide for better supervision of students.
2. A. 2.	Students will work on integrated learning activities while groups of students collectively work on common projects. Each student will have an individual assignment that contributes to the total project completion. This type of activity works well in a two classroom setting with one classroom used for block schedule learning activities and the other used for more directed teaching.
3.	**Space Allocation**
3. A.	General Criteria
3. A. 1.	To accommodate an average of 40 students per period with a capacity of 45 students during peak enrollment
3. A. 2.	A classroom of 960 square feet minimum is recommended.

3. A. 3.	For computer labs with terminals for each student, it is recommended that these classes be located in spaces larger than 960 square feet, preferably from 1,000 to 1,200 square feet.
3. A. 4.	Art labs should be no less than 1,200 square feet.
4.	**Environmental Considerations**
4. A.	General Criteria
4. A. 1.	Each classroom is equipped with a professor workstation. The workstation has a terminal for record keeping and data retrieval, connection to the media center, internet access, and e-mail; pursuant to the District's "Smart Classroom" Standard.
4. A. 2.	This workstation interfaces directly to television monitors or LCD/data projectors.

STANDARD CLASSROOM FEATURES

1.	**Space Allocation**
Wall / Finish. Writing Display Surface	Painted wall interiors, 1 to 2 marker/chalk boards 4 X 12 ft with tack-strips and map hooks. Some classrooms have operable walls for flexibility in group instruction. Motorized retractable projection screen and capability to hang maps / large format instructional posters.
Flooring	All linoleum tiles or other "green" environmentally safe finish.
Ceiling	Suspended acoustical ceiling or gypsum board ceiling with acoustic treatment.
Daylight / views / ventilation	Operable windows on one or two walls and located to receive cross breeze, durable window covering treatment, and durable window locks. Windows shall be shaded and/or provided with low-E glazing to avoid/reduce introduction of direct glaring sunlight.
Electrical	Outlets – 1) per Electrical Code but with a minimum of 4 double duplex outlets per wall and above counter where possible, wire mold at structural concrete walls only. 2) One ceiling outlet centered in room located 15 feet from front for overhead projector, LCD, minimum of 2-20A circuits per classroom. 3) One wall outlet six (6) feet above finished floor located behind television monitor
Lighting	Overhead – District Standard 2X4 or pendant mounted fixtures, zone switched, motion detectors.
Water – Art Only	For art labs, two large and deep stainless sinks with stopper, trap and clay/solids interceptor. Sinks provided with hot/cold water, paper towel dispenser and soap dispenser.
Technology / Communication	To be installed pursuant to District's "Smart Classroom" Standard.
Furniture and Equipment	Chairs/desks for 35 students, 5 computer terminals for standard classroom, 40 terminals for computer lab, 1 to 4 printers, teacher workstation, movable adjustable shelving for book storage, lockable office file cabinet.

VI. SCIENCE CLASSROOM STANDARDS

General Note: Since each comprehensive college will be constructing or retrofitting science labs, the need to develop basic educational standards is important for equity. It is also important for establishing cost estimates. Representatives of each school's science department attended a series of meetings to develop these basic standards for the interior spaces. The science disciplines taught at the colleges include environmental science, integrated science, biology, bioengineering, bio-tech, physics, chemistry, anthropology and earth sciences. The following are design parameters and space features in new and retrofit labs for the instructional area, lab workstations, and preparatory area:

DESIGN SPECIFICATIONS

1.	**Space Allocation**
1. A.	General Criteria -
1. A. 1.	Science classrooms shall accommodate an average of 35 students per period, 40 students per period for peak enrollment.
1. A. 2.	Science laboratories shall accommodate an average of 25 students per period, 30 students per period for peak enrollment.
1. A. 3.	A classroom of 1300 square feet of spaces is recommended; 1800 square feet recommended for laboratory.
1. A. 4.	Recommended space for prep area per classroom is approximately 200 square feet.
2.	**Instructional Area**
2. A.	General Criteria -
2. A. 1.	The instructional area has open space for flexible settings to accommodate various instructional styles. Tables and chairs can be arranged in layouts for individual, small clusters, or row settings for small or large group work.
2. A. 2.	The instructional area, equipped with seating for two students each at each table with a room capacity to accommodate peak enrollment.
2. A. 3.	Approximately 40 to 50 percent of the science laboratory, excluding the teacher preparation and office area, should be designed as instructional area.
2. A. 4.	The cabinetry/counter space may be a resource area for a science library or lockable casework for display of science objects, student-work products, or science fair displays.
2. A. 5.	One wall may have an area for animal or plant display on counters, tables or shelves. This area can also serve as storage for student projects.

2. A. 6.	Science laboratories, particularly physics classrooms / labs, should have the ability to be completely darkened for use of laser and light experiments.
3.	**Laboratory Workstations**
3. A.	General Criteria -
3. A. 1.	Design of the lab workstations will be site specific. In some schools, eight laboratory workstations may be along the periphery with peninsula cabinetry and counter. At perimeter workstations, base cabinets with overhead cabinets are preferred.
3. A. 2.	Designer in general charge shall contract / consult with laboratory design specialist, to design the laboratory workflow and data tracking throughout experiments to meet current industry standards and best practices for data logging.
3. B.	Lab Workstation Details - Seven stations are to be designed for use by four students each and the eighth station to be designed for use by two students with the following design features:
3. B. 1.	Integrated Science
3. B. 1. a.	Minimum 4 deep sinks per classroom **with 5% is designed for ADA accessibility** with sideboard areas at each sink. All sinks have hot and cold water, soap dispenser, and back splash.
3. B. 1. b.	Electricity and technology cabling is enclosed and away from heat and water.
3. B. 1. c.	Classroom access to all safety features and fume hood where applicable, one station or **five (5%) percent** shall be compliant with ADA accessibility per location.
3. B. 1. d.	Width of aisle between stations is to be sufficient for students working and space for passing between stations**.**
3. B. 1. e.	Resin or other high quality, corrosive resistant finish are to be designed for the sinks, counters, and plumbing.
3. B. 2.	Biology, Chemistry, and Bio-tech Labs – shall include all of Integrated Science Design features listed above (1. a-e) in addition to the following:
3. B. 2. a.	Venturi Fume Hood with Air, Gas, Vacuum, cold water, 120 Vac outlet and light. Hood should be equipped with a cup sink and acid neutralizer tank connected to a standard drain. Hood should be equipped with an air flow alarm – or – Bio safety cabinet with HEPA air filters, UV light, air flow alarm, vacuum 'drain' and air or other non-flammable gas service fitting.
3. B. 2. b.	Gas jet with 2 nozzles for each station for 4 students with an emergency shut off control at teacher station.
3. B. 2. c.	Air jet with 2 nozzles for each station for 4 students with a shut off control at teacher station.

3. B. 3.	Physics Labs - All of Integrated Science Design features listed above (1. a-e) in addition to the following:
3. B. 3. a.	Long workstation tables
3. B. 3. b.	Variable power at each workstation (120AC, 0-120 AC and 0-12DC)
3. B. 3. c.	One deep large sink in lieu of Integrated Science sink requirements.
3. B. 3. d.	Gas jet with 2 nozzles for each station for 4 students with an emergency shut off control at teacher station.
3. B. 3. e.	Air jet with 2 nozzles for each station for 4 students with a shut off control at teacher station.
4.	**Professor Preparation/Office/Storage Area**
4. A.	General Criteria -
4. A. 1.	The professor's preparation/office/storage area should be located between two science laboratories, individual offices are preferred, when this cannot be accommodated an office may be shared by two professors.
4. A. 1. a.	Free standing private consultation booths are not acceptable alternatives to private offices, additional conference rooms should be provided when individual offices are not practical.
4. A. 2.	The office area should be equipped with a desk or built in office furniture, a 4 drawer filing cabinets, telephone and computer for professor planning and preparatory work, for each professor. All windows serving offices interior and exterior shall have roller window blinds.
4. A. 3.	The storage area should have movable shelving with a restraining lip to prevent bottles from falling during an earthquake. Cabinets to be made of chemical resistant materials and have solid doors with keyed removable core locks.
4. A. 4.	Carts used to carry supplies to the lab stations need space for storage underneath counters, carts may be used to charge equipment. electrical outlets should be provided in undercounted storage space.
4. A. 5.	Some shelves must accommodate large items.
4. A. 6.	The professor preparation area has counters and a sink with hot and cold water that is used to prepare materials for student experiments, set up demonstrations, and test experiments. This area should be adjacent to a lockable corrosive, flammable and reactive chemical storage area.
4. A. 7.	The preparation area is equipped with an exhaust hood or tissue culture hood near the sink to quickly evacuate fumes. This exhaust system should be separate from the school's centralized air circulation system.
4. A. 8.	The preparation area should have space planned for an autoclave, microwave, dishwasher, incubator and fullsize refrigerator, as well as storage for balances, microscopes, glassware, etc. This is in addition to the equipment stored in the classroom.

5.	Environmental Considerations
5. A.	General Criteria
5. A. 1.	The major environmental consideration in science laboratories is safety of students and staff.
5. A. 2.	The impact of the air quality and disposal of hazardous wastes is also a concern. Providing a design that incorporates features for safe laboratory practices is critical to the educational specifications. Certain practices taught in science can enhance safe conditions. Design features that promote safe laboratory practices without reducing the quality or type of science activities are important for safety.
5. B.	Design Features
5. B. 1.	Storage for safety goggles in each lab in a specialized sanitizer cabinet allowing for isolated (non-stacking) storage to encourage their use during laboratory work.
5. B. 2.	Locating electrical outlets (GFI with cover plates) away from gas and water to avoid shocks when electrical equipment is set up.
5. B. 3.	Proper installation of fume hoods / bio-safety cabinets in Bio-tech, Biology, and Chemistry labs using separate exhaust.
5. B. 4.	Eyewash stations for emergency use in both science lab and prep area shall be prominently located within 55 feet of all laboratory work stations. Eyewash stations must be self-contained and self-flushing tempered water (between 85- and 110-degrees F) and ADA accessible.
5. B. 5.	Deluge Shower systems for emergency use in science labs and prep area. Must be tempered water (between 85- and 110- degrees F) and ADA accessible located above a one (1) foot square grated drain connected to the buildings plumbing system to mitigate flooding the floor when used.
5. B. 6.	Proper disposal of surplus, waste, and deteriorated chemicals and biohazard wastes. Hazardous waste may not be disposed of in regular trashcans or emptied on the ground surface. They may not be flushed down sinks or toilets. Portable containers specially designed for this purpose are provided.
5. B. 7.	Appropriately designed special disposal area for temporary storage of waste while awaiting pickup by a commercial waste transporter.
5. B. 8.	Master control of gas, air, and water shut-off valves at teacher workstation and in student workstation area in lab or near an emergency exit.
5. B. 9.	Openly displayed first-aid kits and other safety/emergency materials (e.g. fire blankets, sand).
5. B. 10.	Signs warning of hazardous chemicals, venomous animals, poisonous plants, etc.
5. B. 11.	Prominently displayed fire extinguishers, and access to fire alarm pull stations.
5. B. 12.	Signs for safe evacuation routes.

5. B. 13.	Design of laboratory stations to have sufficient space to avoid blocking of traffic lanes; allow orderly evacuation or emergency treatment, in the event of an emergency, with sufficient space for ADA evacuation. Each lab is equipped with smoke alarms or heat detectors. Exhaust and supply ducts to have smoke detectors installed.
5. B. 14.	Lockable flammable storage cabinets for chemical storage in both prep rooms and laboratory spaces if needed.
6.	**Professor Workstations**
6. A.	General Criteria
6. A. 1.	The professor workstation has the capability to control all media technology in the laboratory.
6. A. 2.	The workstation is designed for a microscope and microscope-flex camera that displays demonstrations of small objects being conducted by the teacher on an overhead monitor or projector.
6. A. 3.	The professor workstation can be used to display digital content and other presentation materials from the LCD to a classroom monitor or projection screen; pursuant to the District's "Smart Classroom" Standard
7.	**Space Features**
7. A.	General Criteria
7. A. 1.	The quality of materials is a major concern in the construction of science laboratories. Finishes should be durable and be able to withstand chemicals and abundant water typically used in the labs and not subject to warping.
7. A. 2.	Cabinetry should be made of material, preferably wood, which can withstand continuous use by students, with long lasting finishes.
7. A. 3.	Handles and doorknobs and locks and outlets should be strong enough to resist vandalism.
7. A. 4.	The instructional area should have a maximum amount of natural daylight and operable windows, but also the ability to be completely darkened for physics light experiments and multimedia display.
7. A. 5.	The room is equipped with a minimum of one full wall of white boards with tack strips and map hooks, display cabinetry or counters for animals/plants, cabinetry for student work projects and other storage and bookshelves with the following features: (see table below)

SCIENCE CLASSROOM FEATURES

Item:	Features:
Wall Finish	Breathable, washable and chemical resistant.
Writing/Display Surface	Porcelain magnetic marker/white boards installed the full length of wall behind teacher station and on available spaces of the two adjacent walls, with tack-strips and map hooks, retractable projection screen and capability to hang chemistry charts or other large reference charts.
Flooring	VCT, Epoxy flooring or other "green" environmentally safe chemical resistant floor covering.
Ceiling	Gypsum board ceiling with acoustic treatment, ceiling grid system to hang objects.
Daylight/Views/Ventilation	Rooms with fume hoods or tissue culture hoods shall not have operable windows to maintain designed air pressure. All other laboratories shall have operable windows located to receive a cross breeze, durable window blinds, window shelf for plants (optional), durable locks. Window glass is tinted to reduce glare. Exterior and interior shading devices can also be used to control day lighting.
Cabinetry	Optional -7' high 5'wide display cabinet, adjustable shelving for student work, counter or shelving for animal or plant display. WI (Wood Institute) Premium Grade cabinetry for workstations with locked storage of supplies underneath and above on two walls. Durable locks with interchangeable cores, all lockable with master key. Counter surface shall be a durable chemical resistant material. Chemical resistant vinyl laminates not acceptable. Teacher workstation has same type of cabinetry. Separate cabinets for acids, reactive chemicals and flammables, with designated storage area for chemicals.
Electrical/Gas	Two-four plug outlets at each workstation located away from water. Additional outlet for computer terminal, (two double duplex outlets per wall) where lab stations are not located. Three data/power floor outlets down center of room for use of projection system. One ceiling data/power outlet. 3-20 amp circuit. Provide stub-outs for future power for all services. One duplex gas outlet- per 4 students. Centralized shut-off valve and electrical shut off at teacher workstation. Gas shut-off at each work station.
Lighting	Overhead – District standard 2x4 or pendant mounted dimming fixtures, zone switched, motion detectors. Provide direct lighting over teacher demonstration workstation (no mirrors), fluorescent lights under overhead cabinetry.
Water	Durable epoxy large and deep sink with stopper trap at each sink including teacher's workstation and preparation area. Gooseneck faucets; no jets. Cold and hot water. One eyewash in science lab and one in prep area. One deluge shower in science lab and prep area. Chemical resistant drain pipes.

Heat/Air/ Ventilation	Silent ceiling fan with blunt blade, cross-ventilation in instructional area. Fume hoods with sink in and separate ventilation system. Ventilation system, floor and ceiling, changes air a minimum of 5 times in an hour in classrooms and 6 times an hour in prep rooms. Emergency air evacuation system is installed with switch by teacher workstation and monitored by EMS.
Technology/ Communication	Technology and communication provided pursuant to the District's Interactive Learning Environment ("Smart Classroom") Standard
Furniture and Equipment	Durable, chemical resistant tabletops, table sized for seating two students each. Chairs and stools for 30 students.
Comments	Provide 1 ADA compliant teacher station and five (5%) percent of student stations per laboratory.

VII. ATHLETIC FACILITIES STANDARDS

DESIGN SPECIFICATIONS

1.	**Technology**
1. A.	General Criteria
1. A. 2.	Faculty should be able to electronically raise, and lower ceiling mounted athletic equipment and window shades with keyed wall mounted control switches.
1. A. 3.	Faculty and students should be able to connect to speaker system with audio and microphones input. Audio control panel should be mounted at a height comfortable for both students and Faculty.
1. A. 4.	Technology and communication provided pursuant to the District's Interactive Learning Environment Standard.
2.	**Adaptive Learning Space**
2. A.	General Criteria
2. A. 1.	The large group activity spaces should have the ability to be divided and partitioned off by teachers and coaches to allow for multiple classes to use the space or for students / athletes to work in smaller groups.
3.	**Space Allocation**
3. A.	General Criteria
3. A. 1.	Competition Gymnasium: Sized appropriately for school supported team sports and anticipated spectators, room should be no less than 15,000 square feet unless approved by the district.
3. A. 2.	Recreation / Practice Gymnasium: Sized appropriately for planned recreational sports, room should be no less than 6,000 square feet unless approved by the district.

3. A. 3.	Locker room, Showers, and Training room: Sized appropriately for use, area should be no less than 2,500 square feet unless approved by the district.
3. A. 4.	Team Rooms: Sized appropriately for use, room should be no less than 500 square feet unless approved by the district. The roster size of the teams intended to use specific rooms should be accounted for in determining the final rooms size, ie: a basketball team (15 athletes) will need a smaller room than a football team (56 athletes).
3. A. 5.	Fitness Center: Sized appropriately for use, room should be no less than 1,500 square feet unless approved by the district.
3. A. 6.	Equipment storage: rooms should be sized appropriately for required sports / maintenance equipment to be easily stored in separate and lockable rooms. Storage rooms should be planned to allow for easy movement of large equipment into and out of the secured storage area.
3. A. 7.	Offices / support spaces (minimum sizes): - Ticket office (120 sqft) - Concession stand (300 sqft) - Coaches offices (as required by Athletics Department) (100 sqft) - Education offices (as required by Physical Education Department) (100 sqft) - Dance instructor's office (100 sqft) - Councilors office (150 sqft) - Conference rooms (250 sqft) - Facility management offices (100 sqft)
3. B.	Student Athlete Support Center:
3. B. 1.	Two classrooms of 1,000 square feet minimum are recommended.
3. B. 1. a.	Standard classroom with 35 student desk / chairs, teacher workstation, adjustable shelving for book storage and a lockable office file cabinet.
3. B. 1. b.	Computer lab with 40 terminals, 2 printers, teacher workstation
4.	**Environmental Considerations**
4. A.	General Criteria
4. A. 1.	Acoustic consideration should be a priority for gymnasiums. Designer should target an acoustical reverberation time be between 1.5 and 2 seconds
4. A. 2.	Audio and microphone inputs should interact directly with the speaker system and be compatible with scoreboards and announcers' station. As well as provide connectivity for teacher / coaches to use for instruction.
4. A. 3.	All facilities with public spectators shall be accompanied by both a Ticket booth and a Concession Stand.
4. A. 4.	All athletic fields and courts are to be sized to meet the competition requirements of NCAA athletic standards.

4. A. 5.	Track and Field facilities shall be designed to meet competition requirements of USA Track and Field, as well as NCAA Athletic Standards.

ATHLETIC FACILITIES FEATURES

1.	**COMPETITION GYMANASIUM**
Wall / Finish.	Impact resistant gyp board up to 12 feet above finished floor and five feet above top of bleachers, Acoustic wall panels at upper third of walls and five feet above top of bleachers.
Flooring	Sprung hardwood athletic flooring system with maple finish, vented cove base.
Ceiling	Exposed structural acoustic metal decking
Daylight / views / ventilation	Operable windows on one or two walls and located to receive cross breeze, durable window covering treatment, with electronic openers. Windows shall be shaded and/or provided with low-E glazing to avoid/reduce introduction of direct glaring sunlight.
Heat/ Air/ Ventilation	Gymnasium should be fully climate controlled to care for hardwood floor. High Velocity Low Speed fans are encouraged to reduce mechanical equipment load.
Electrical	Outlets – 1) per Electrical Code but with a minimum of 4 double duplex outlets per wall and above counter where possible, wire mold at structural concrete walls only. 2) ceiling outlets / splicing boxes as required for ceiling mounted equipment. 3) electrical outlet in floor as required for score keepers' tables for basketball and volleyball configurations
Lighting	Overhead – District Standard 2x2 pendant mounted / suspended fixtures, zone switched, with motion detectors.
Water	No water allowed in room to protect hardwood flooring, accessible high/low drinking fountains shall be located outside in lobby or other adjacent corridor / hallway spaces at each end of gymnasium.
Technology / Communication	Wi-Fi drops as required to create equal coverage throughout space. Speakers mounted and connected to audio input panel for announcers' station and instructional use.
Storage	Separate and lockable storage should be provided for: - Basketball Team - Volleyball Team - Recreation Equipment - Chairs and Floor Covering - Facilities / Maintenance Equipment
Furniture and Equipment	Standard gymnasium equipment shall include but not limited to: - Automated Telescopic bleachers: 2,000 person capacity unless otherwise requested by the district

	- Basketball Standards w/ shot clock: ceiling mounted or portable, for each court. - Roll-Up Gymnasium Divider Curtain: automated ceiling mounted dividers - Multi-Sport Video Scoreboards: wall mounted on each end of court, and as required based on visibility. - Volleyball Stations and Floor Sleeves: one center court and two competition NCAA sized volleyball courts - Wall Padding: where run off spaces are less than 10 feet
2.	**PRACTICE GYMANASIUM**
Wall / Finish.	Impact resistant gyp board up to 12 feet above finished floor, Acoustic wall panels at upper third of walls.
Flooring / Base	Resilient flooring with foam backing, with rubber base.
Ceiling	Exposed structural acoustic metal decking
Daylight / views / ventilation	Operable windows on one or two walls and located to receive cross breeze, durable window covering treatment, with electronic openers. Windows shall be shaded and/or provided with low-E glazing to avoid/reduce introduction of direct glaring sunlight.
Heat/ Air/ Ventilation	High Velocity Low Speed (HVLS) fans coupled with natural ventilation is encouraged in lieu of a mechanical cooling systems.
Electrical	Outlets – 1) per Electrical Code but with a minimum of 4 double duplex outlets per wall and above counter where possible, wire mold at structural concrete walls only. 2) ceiling outlets / splicing boxes as required for ceiling mounted equipment.
Lighting	Overhead – District Standard 2x2 pendant mounted / suspended fixtures, zone switched, with motion detectors.
Water	One accessible high/low drinking fountain at each end
Technology / Communication	Wi-Fi drops as required to create equal coverage throughout space. Speakers mounted and connected to audio input panel for instructional use and audio playback.
Storage	Separate and lockable storage should be provided for: - Basketball Team - Volleyball Team - Recreation Equipment - Facilities / Maintenance Equipment
Furniture and Equipment	Standard gymnasium equipment shall include but not limited to: - Telescopic bleachers: 500 person capacity - Basketball Standards w/ shot clock: wall/ceiling mounted, minimum two practice size basketball courts. - Roll-Up Gymnasium Divider Curtain: automated ceiling mounted dividers. - Multi-Sport Scoreboards: wall mounted on each end of court, for each court. - Volleyball Stations and Floor Sleeves: minimum two courts.

	- Wall Padding: where run off spaces are less than 10 feet
3.	**FITNESS CENTER**
Wall / Finish.	Impact resistant gyp board full height above finished floor.
Flooring / Base	Rubber flooring with increased padding at lifting areas
Ceiling	Mineral Fiber Acoustical Ceiling Tile: Impact Resistant and Washable tiles
Daylight / views / ventilation	Operable windows on one or two walls and located to receive cross breeze, durable window covering treatment, with electronic openers. Windows shall be shaded and/or provided with low-E glazing to avoid/reduce introduction of direct glaring sunlight.
Heat/ Air/ Ventilation	High Velocity Low Speed (HVLS) fans coupled with natural ventilation is encouraged in lieu of a mechanical cooling systems.
Electrical	Outlets – 1) per Electrical Code but with a minimum of 4 double duplex outlets per wall and above counter where possible, wire mold at structural concrete walls only. 2) ceiling outlets / splicing boxes as required for ceiling mounted equipment. 3) Additional electrical capacity in cardio area for future expansion
Lighting	Overhead – District Standard 2x4 troffer / suspended fixtures, zone switched, with motion detectors.
Water	One accessible high/low drinking fountain at each end
Technology / Communication	Wi-Fi drops as required to create equal coverage throughout space. Speakers mounted and connected to audio input panel for instructional use and audio playback.
Storage	Single large storage room.
Furniture and Equipment	Standard gymnasium equipment shall include but not limited to: - 8 ft. mirrors mounted 12” a.f.f. on two adjacent room walls. - Stretching / Exercise Mats - Cardio Exercise Equipment - Free Weights and Benches - Deadlift Stations
3.	**DANCE ROOM**
Wall / Finish.	Impact resistant gyp board full height above finished floor, with mirrors mounted on a minimum of two adjacent room walls.
Flooring / Base	Sprung hardwood athletic flooring system with maple finish, vented cove base.
Ceiling	Mineral Fiber Acoustical Ceiling Tile: Impact Resistant and Washable tiles
Daylight / views / ventilation	Operable windows on one or two walls and located to receive cross breeze, durable window covering treatment, with electronic openers. Windows shall be shaded and/or provided with low-E glazing to avoid/reduce introduction of direct glaring sunlight.

Heat/ Air/ Ventilation	High Velocity Low Speed (HVLS) fans coupled with natural ventilation is encouraged in lieu of a mechanical cooling system.
Electrical	Outlets – 1) per Electrical Code but with a minimum of 4 double duplex outlets per wall and above counter where possible, wire mold at structural concrete walls only. 2) ceiling outlets / splicing boxes as required for ceiling mounted equipment.
Lighting	Overhead – District Standard 2x4 troffer fixtures (suspended or pendent mount is not acceptable in dance studio), zone switched, with motion detectors.
Water	No water allowed in room to protect hardwood flooring, one accessible high/low drinking fountain in adjacent hallway / corridor.
Technology / Communication	Wi-Fi drops as required to create equal coverage throughout space. Speakers mounted and connected to audio input panel for instructional use and audio playback. Projection screen and projector shall be included for instruction.
Storage	Separate and lockable storage should be provided for: - Dance costumes / wardrobe storage - Dance equipment storage (portable dance barre, portable mirrors, stretching / exercise equipment and mats, ect.)
Furniture and Equipment	Standard gymnasium equipment shall include but not limited to: - Floor mounted fixed dance barres. - 8’ Mirrors mounted 6” a.f.f. on two adjacent room walls.
4.	**LOCKER ROOMS**
Wall / Finish.	Impact resistant gyp board with painted finish.
Flooring / Base	Epoxy flooring & base
Ceiling	Mineral Fiber Acoustical Ceiling Tile: Impact Resistant and Washable tiles
Daylight / views / ventilation	Traditional or Solar tube skylights to add natural light for centrally located locker rooms or clear story windows above 10 feet Windows shall be shaded and/or provided with low-E glazing to avoid/reduce introduction of direct glaring sunlight.
Electrical	Outlets – 1) per Electrical Code but with a minimum of 4 double duplex outlets per wall and above counter where possible, wire mold at structural concrete walls only.
Lighting	Overhead – District Standard 2x4 troffer fixtures, zone switched, motion detectors.
Water	One accessible high/low drinking fountain, in each locker room.
Technology / Communication	Wi-Fi drops as required to create equal coverage throughout space.
Furniture and Equipment	Standard gymnasium equipment shall include but not limited to: - All Metal Lockers (five (5%) percent shall be ADA compliant) - 12” wide x 3, 5, or 8 ft long Standard Benches - 4 ft x 2 ft Accessible changing benches serving each ADA locker area

OUTDOOR ATHLETIC FACILITIES FEATURES

1.	ATHLETIC FIELDS
Surfacing	Synthetic Turf with two-year service contract: 30 – 40 oz face weight, conforming to all accessible requirements for sports fields
Seating	Aluminum bleachers on a minimum of two side of field. Minimum seating of 3,000 people.
Electrical	Curtesy outlets should be provided at team benches.
Lighting	Pole mounted lighting fixtures to create equal coverage throughout field and bleachers without significant overflow.
Water	Accessible high/low drinking fountains located at each end of bleachers
Technology / Communication	Wi-Fi drops as required to create coverage throughout space. Speakers mounted and connected to audio input panel at announcers' booth with portable system for instructional use and audio playback.
Furniture and Equipment	Standard field equipment shall include but not limited to: - Team benches & tables - Multi-Sport Video Scoreboard - Team equipment carts - Portable equipment racks
Storage	Separate and lockable storage should be provided for: - Each athletic team with accesses to field - Educational equipment storage - Maintenance equipment
2.	**TRACK AND FIELD**
Surfacing	Polyurethane Synthetic track surface (Full-Pour System) with two-year service contract. Track should accommodate at a minimum 8 lanes unless otherwise approved by district.
Seating	Aluminum bleachers on a minimum of two side of track. Minimum seating of 2,000 people.
Electrical	Curtesy outlets should be provided at team benches, score keepers table and bleachers.
Lighting	Pole mounted lighting fixtures to create equal coverage throughout field and bleachers without significant overflow.
Water	Accessible high/low drinking fountains located at each end of bleachers
Technology / Communication	Wi-Fi drops as required to create coverage throughout space. Speakers mounted and connected to audio input panel at announcers' booth with portable system for instructional use and audio playback.

Furniture and Equipment	Standard field equipment shall include but not limited to: - Team benches & tables - Video multi-sport Scoreboard - Portable Timing Equipment - Team equipment carts - Portable equipment racks
Storage	Separate and lockable storage should be provided for: - Large lockable storage, compartmentalized for each track and field sport. - Maintenance equipment
3.	**AQUATIC CENTER**
Surfacing	Natural color concrete with a medium broom finish.
Seating	Aluminum bleachers on a minimum of one side of pool. Minimum seating of 1,000 people.
Electrical	Curtesy outlets should be provided at team benches and score keepers table.
Lighting	Pole mounted lighting fixtures to create equal coverage throughout pool deck and pool (including bottom of pool) as well as bleacher seating.
Water	- Accessible high/low drinking fountains located at each end of bleachers and near locker rooms. - Rinsing area on pool deck connected to sewer system and protected from rainwater runoff.
Technology / Communication	Wi-Fi drops as required to create coverage throughout space. Speakers mounted and connected to audio input panel at announcers' station with portable system for instructional use and audio playback.
Locker rooms	Separate men's and women's locker rooms with gender neutral (family) locker room Containing: - Restrooms - Showers - Changing rooms - Training / Taping rooms
Furniture and Equipment	Standard equipment shall include, but not limited to: - Electronic timing system with touch pads - Water Polo Goals - Team Benches and Tables - Score Keepers Table - Portable Equipment Racks - Team Equipment Carts - Portable Lifeguard Chair
Storage	Separate and lockable storage should be provided for: - Lockable storage space for each athletic team - Maintenance equipment - Pool chemical storage