

Public School Construction Requirements

WLC Architects, Inc.

23 March 2016



Foster City E.S.



El Cerrito H.S.



Coronado E.S.

School Construction Features

Public School Construction Requirements

1. *Public schools are required to provide programs, services and a comprehensive educational curriculum for the community.*
2. *Public Funds vs. Private Funds: public funds require extensive construction standards, agency reviews, testing and continuous inspections. (e.g.: DSA, CGS, CDE, DTSC, LFM, etc.)*
3. *WCCUSD Board approved Educational Master Plan, is the basis for the Educational Specifications used for all school design.*
4. *San Francisco Bay Area Construction Costs are the highest in the State.*
5. *It is anticipated* schools will be used as emergency disaster centers after a disaster, due to their durability and size. (* Field Act of 1933)*

School Construction Features

Public School Construction Requirements

Programs, Services & Curriculum

1. *Public schools are required to provide programs, services and a comprehensive educational curriculum for the community.*
 - a. *Board Approved Educational Master Plans:*
 - *Provide facilities needed to serve its students (e.g.: Performance Theaters, Learning Academies, Auxiliary Gymnasiums, etc.)*
 - *Provides amenities for the communities it serves (e.g.: Health Clinic spaces, community kitchens, etc.)*
 - *Requires Special Education classrooms be included in every school constructed.*

School Construction Features

School Construction

Public Funds vs Private Funds

1. *Public Funds vs. Private Funds:*
 - a. *Public Schools are, or may be, required to be reviewed by many agencies. (e.g.: CDE, DSA, CGS, HSD and DTSC)*
 - b. *DSA-Field Act requires extensive construction plan reviews and procedures not found in municipal reviews.*
 - c. *DSA-Field Act requires construction testing and special inspections procedures not found in municipal reviews.*
 - d. *WCCUSD engages Project Labor Agreements (PLAs) that provide for prevailing wage and other requirements for projects.*

School Construction Features

Public School Construction Requirements

Field Act: California Seismic Safety for Schools



Earthquakes: Not a matter of if but when!

School Construction Features

Public School Construction Requirements

Field Act: California Seismic Safety

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1019700-03-P4

Division of the State Architect
CALIFORNIA DEPARTMENT OF GENERAL SERVICES

FORM DSA-103 rev 1/12
Statement of Structural Tests and Special Inspections

INCREMENT # _____ DSA File No.: 7-47
Application No.: 01-113561

Date Submitted: 10/1/2015 Revised: _____

School Name: PINOLE VALLEY HIGH SCHOOL District: WEST CONTRA COSTA UNIFIED SCHOOL DISTRICT

IMPORTANT: This form is only a summary list of structural tests and special inspections required for the project. The actual tests and inspections must be performed as detailed on the DSA approved documents. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A. NOTE: This form is also available for projects submitted for review under the 2007 CBC.

Note: All references to the California Building Code (CBC) are to the 2010 edition.

TEST OR SPECIAL INSPECTION	TYPE	PERIODIC	SI	PP	PI	GE*	LAB	CODE REFERENCE AND NOTES
SOILS								
1. GENERAL: Table 1704A.7								
a. Verify that site has been prepared properly prior to placement of controlled fill and/or excavations for foundations. Foundation excavations are extended to proper depth and have reached proper material, and materials below footings are adequate to achieve the design bearing capacity.	Periodic					GE*		* By geotechnical engineer or his or her qualified representative.
2. COMPACTED FILLS: Table 1704A.7								
a. Perform qualification testing of fill materials.	Test	Lab				GE*		* Under the supervision of the geotechnical engineer.
b. Verify use of proper materials and inspect fill thicknesses, placement, and compaction during placement of fill.	Continuous					GE*		* By geotechnical engineer or his or her qualified representative.
c. Test compaction of fill.	Test	Lab				GE*		* Under the supervision of the geotechnical engineer.
4. CAST-IN-PLACE DEEP FOUNDATIONS (PIERS): Table 1704A.9								
a. Inspect drilling operations and maintain complete and accurate records for each pier.	Continuous					GE*		* By geotechnical engineer or his or her qualified representative.
b. Verify locations of piers.	Continuous				PI			
c. Confirm pier diameters, plumbness, bell diameters (if applicable), lengths, and embedment into bedrock (if applicable). Record concrete or grout volumes.	Continuous				GE*			* By geotechnical engineer or his or her qualified representative.
e. Concrete piers.	Provide tests and inspections per CONCRETE section below.							
5. RETAINING WALLS:								
a. Placement of soil reinforcement, drainage devices, and backfill.	Continuous					GE*		* Placement, compaction and inspection of backfill per Section 1704A.7.1 for fill supporting foundations (see Section 2 above).

DSA-103 (rev 03-19-12) * In the CODE REFERENCE AND NOTES column indicates DSA-SS/CC sections that can be used by community colleges, per 2010 CBC Sec. 1.9.2.2.

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TEST OR SPECIAL INSPECTION	TYPE	PERIODIC	SI	PP	PI	GE*	LAB	CODE REFERENCE AND NOTES
CONCRETE								
7. CAST IN PLACE CONCRETE Table 1704A.4								
Material Verification and Testing:								
a. Verify use of required design mix.	Periodic					SI		* To be performed by batch-plant special inspector and project inspector.
b. Test reinforcing steel.	Test	Lab				SI	1916A.2 (1916.1.1)*, ASTM A370. See IR 17-10.	
c. Perform slump, temperature, and (where required) air content tests.	Test	Lab				SI	ASTM C172, ASTM C31.	
d. Test concrete (compression).	Test	Lab				SI	1905A.6 (1905.6)*, ASTM C39.	
Inspection:								
a. Inspect batching of concrete.	Continuous					SI	1704A.4.2. (see 1704A.4.3, option 2 for waiver based on design parameters).	
b. Inspect placement of formwork, reinforcing steel, embedded items and concrete. Inspect curing and form removal.	Continuous					PP*	* May be performed by a special inspector when specifically approved by DSA.	
c. Welding of reinforcing steel.	Provide special inspection per STEEL, category 19.1(d) & (e) and/or 19.2(g) & (h) below.							
9. PRECAST CONCRETE (in addition to Cast in Place Concrete tests and inspections):								
a. Inspect fabrication of precast concrete members.	Continuous					SI		
b. Inspect erection of precast concrete members.	Continuous					SI		* May be performed by a special inspector when specifically approved by DSA.
11. POST-INSTALLED ANCHORS:								
a. Inspect installation of post-installed anchors.	Continuous					PI	Table 1704A.4	
b. Test post-installed anchors.	Test	Lab				SI	1916A.7 (1916.1.1)*	
MASONRY Table 1704A.5.3								
13. STRUCTURAL MASONRY:								
Material Verification and Testing:								
a. Test masonry units, mortar and grout (unit strength method).	Test	Lab				SI	2103A.13 (2103.13)*, ASTM A370	
b. Test masonry units, mortar and grout (unit strength method).	Test	Lab				SI	1708A.1.4 and 2105A.2.2.1 (or 1708A.1.4, 2105.2.2.1* and 2114.6.1*), ASTM C140, C1586 & C1019.	
c. Verify proportions of site-prepared, premixed or preblended mortar and grout.	Periodic					SI	ASTM C780.	
d. Test core-drilled samples.	Test	Lab				SI	2105A.4 (2114.9.3)*	
Inspection:								
a. Verify work, location and condition of all dowels, construction supporting masonry, etc.	Periodic					SI		
b. Verify specified size, grade, and type of reinforcement.	Periodic					SI		
c. Inspect placement of reinforcement, connectors, masonry units and construction of masonry joints.	Periodic					SI		
d. Verify protection of masonry during cold weather (temperature below 40° F) or hot weather (temperature above 90°).	Periodic					SI	2104A.3 and 2104A.4 (2104.3* and 2104.4*).	

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TEST OR SPECIAL INSPECTION	TYPE	PERIODIC	SI	PP	PI	GE*	LAB	CODE REFERENCE AND NOTES
STEEL Table 1704A.3								
17. STRUCTURAL STEEL AND COLD-FORMED STEEL USED FOR STRUCTURAL PURPOSES								
Material Verification:								
a. Verify that all materials are appropriately marked and that:	Periodic							* By special inspector when performed off-site; by project inspector for steel shipped directly to project site without welding or fabrication.
• Mill certificates indicate material properties that comply with requirements.								
• Material sizes, types and grades comply with requirements.								
b. Test unidentified materials.	Test	Lab				SI	2003A.1 (2203.1)*, ASTM A370.	
c. Examine beam welds of structural tubes and pipes.	Continuous					SI*	* See DSA IR 17-3.	
Inspection:								
d. Verify member locations, bracing and all details constructed in the field.	Continuous					PI		
e. Verify stiffener locations, connection tab locations and all construction details fabricated in the shop.	Periodic					SI		
18. HIGH STRENGTH BOLTS:								
Material Verification of High-Strength Bolts, Nuts, and Washers:								
a. Verify weld filler material identification markings per AWS designation listed on the DSA approved documents and the WPS.	Periodic					SI	See DSA IR 17-9.	
b. Test high-strength bolts, nuts and washers.	Test	Lab				SI	2212A.1 (2211.5.1)*, ASTM F436, A370. DSA IR 17-8.	
Inspection of High-Strength Bolt Installation:								
c. Bearing-type ("snug tight") connections.	Periodic					SI*	See DSA IR 17-9.	
d. Slip-critical connections.						SI	* "Continuous" or "Periodic" depends on the lightning method used, see IR 17-9 and 1704A.3.3.	
19. WELDING:								
Verification of Materials, Equipment, Welders, etc.:								
a. Verify weld filler material identification markings per AWS designation listed on the DSA approved documents and the WPS.	Periodic					SI	See DSA IR 17-9.	
b. Verify weld filler material manufacturer's certificate of compliance.	Periodic					SI	See DSA IR 17-3.	
c. Verify WPS, welder qualifications and equipment.	Periodic					SI	See DSA IR 17-3.	
19.1 SHOP WELDING:								
a. Inspect groove, multi-pass, and flat welds > 5/16"	Continuous					SI	Per AWS D1.1 and AWS D1.8 (AWS D1.3 for cold formed steel).	
b. Inspect single-pass flat welds < 5/16"	Periodic					SI	Per AWS D1.1 and AWS D1.8 (AWS D1.3 for cold formed steel).	

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TEST OR SPECIAL INSPECTION	TYPE	PERIODIC	SI	PP	PI	GE*	LAB	CODE REFERENCE AND NOTES
FIELD WELDING:								
a. Inspect groove, multi-pass, and flat welds > 5/16"	Continuous					SI	Per AWS D1.1 and AWS D1.8 (AWS D1.3 for cold formed steel).	
b. Inspect single-pass flat welds < 5/16"	Periodic					SI	Per AWS D1.1 and AWS D1.8 (AWS D1.3 for cold formed steel).	
c. Inspect end-welded studs (ASTM A-108) installation (including bend test).	Periodic					SI	Per AWS D1.1 and AWS D1.8 (AWS D1.3 for cold formed steel).	
d. Inspect floor and roof deck welds.	Periodic					SI	Per AWS D1.1 and AWS D1.8 (AWS D1.3 for cold formed steel).	
e. Inspect welding of structural cold-formed steel.	Periodic					SI*	* May be performed by the project inspector when approved by DSA. See DSA IR 17-3.	
f. Inspect welding of stairs and railing systems.	Periodic					SI*	* May be performed by the project inspector when approved by DSA. See DSA IR 17-3.	
g. Verification of reinforcing steel weldability.	Periodic					SI	1704A.4.1, verify carbon equivalent reported on mill certificates.	
h. Inspect welding of reinforcing steel.	Continuous					SI	1704A.3.1.3, 1704A.3.1.4 and Table 1704A.3 Item Bb. AWS D1.4.	
20. NONDESTRUCTIVE TESTING:								
a. Ultrasonic	Test	Lab				SI	AISC 341, App. Q 5.2. AWS D1.1, D1.8. ANS/ASNT CP-189, SNT-TC-1A - ASTM E543, E1212 - DSA IR 17-2.	
b. Magnetic Particle	Test	Lab				SI		
21. STEEL JOISTS AND TRUSSES:								
a. Verify size, type and grade for all chord and web members as well as connectors and weld filler material; verify joint profile, dimensions and camber (if applicable); verify all weld locations, lengths and profiles; mark or tag each joint.	Continuous					SI	1704A.3.2.1 and DSA IR 22-3 for steel joists only. 1704A.3.2.2 for steel trusses.	
22. SPRAY APPLIED FIRE-PROOFING:								
a. Examine structural steel surface conditions, inspect application; take samples, measure thickness, and verify compliance of all aspects of application with DSA approved documents.	Continuous					SI	1704A.12, ASTM E605.	
b. Test bond strength.	Test	Lab				SI	1704A.12.6, ASTM E738.	
c. Test density.	Test	Lab				SI	1704A.12.6, ASTM E605.	
23. OTHER STEEL:								
a. Framing of cold formed steel at mansards	Periodic					SI		
WOOD								
OTHER Section 1704A.15								
27. SKYLIGHT LOAD TEST	Test	Lab						
28. SHEAR STUD BEND TEST	Test	Lab						

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29. SIDE PLATE MF CONNECTION								
30. BRICK VENEER BOND STRENGTH TEST								
See quality assurance notes on sheet SP100 of construction drawings.								
Summary of Verified Reports Required:								
Note: Project Inspector, contractor, architect and engineer verified reports are always required (Form DSA-6 or DSA-6A/E as applicable).								
1. Soils testing and inspection: Geotechnical Verified Report - Form DSA-293								
2. All Structural Testing: Laboratory Verified Report - Form DSA-291								
3. Concrete Batch Plant Inspection: Special Inspection Verified Report - Form DSA-292								
4. Precast Concrete Inspection: Special Inspection Verified Report - Form DSA-292								
5. Masonry Inspection: Special Inspection Verified Report - Form DSA-292								
6. Shop Welding Inspection: Special Inspection Verified Report - Form DSA-292								
7. Field Welding Inspection: Special Inspection Verified Report - Form DSA-292								
8. HS Bolt Installation Inspection: Special Inspection Verified Report - Form DSA-292								
9. Steel Joist Fabrication Inspection: Special Inspection Verified Report - Form DSA-292								
10. Fire-Proofing Application Inspection: Special Inspection Verified Report - Form DSA-292								
KEY TO Columns								
1 Type -					2 Performed By -			
Continuous - Indicates that a continuous special inspection is required					GE - Indicates that the special inspection is to be performed by a registered geotechnical engineer or his or her authorized representative			
Periodic - Indicates that a periodic special inspection is required					Lab - Indicates that the test is to be performed by a testing laboratory accepted in the DSA laboratory Evaluation and Acceptance (E/A) Program			
Test - Indicates that a test is required					PI - Indicates that the special inspection is to be performed by the project inspector			
					SI - Indicates that the special inspection is to be performed by a special inspector			
(Note: The difference between "tests" and "special inspections" is addressed in IR 17-4)								
COMPILE					PRINT			
(Note that reassignment of responsibility is permitted only with the written approval of DSA)								
Kevin MacQuarrie Name of Architect or Engineer in general responsible charge					IDENTIFICATION STAMP DIV OF THE STATE ARCHITECT APP # 01-113561			
Warren Pottebaum Name of Structural Engineer (When structural design has been delegated)					AC N/A FRS N/A SS WFD/L			
<i>[Signature]</i> Signature of Architect or Structural Engineer					DATE 10/29/2015			
					Architect or Structural Engineer Stamp			

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School Construction Features

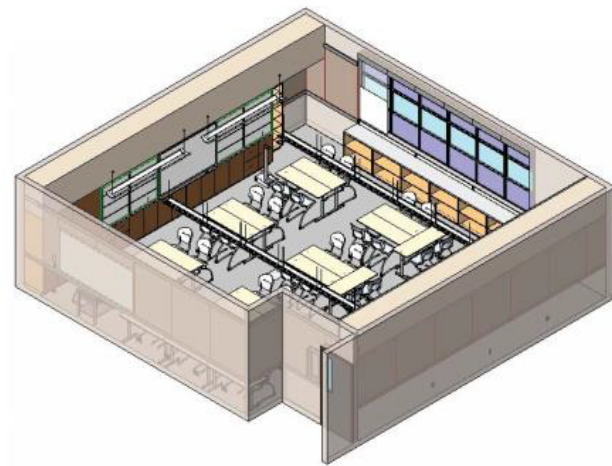
Public School Construction Requirements

Educational Specifications and District Standards

1. *Educational Specifications and District Standards:*
 - a. *The Board of Education approves educational specifications for the design of all facilities and play yards.*
 - b. *The Board of Education approves classroom count and space allocation matrices.*
 - c. *The Board of Education also approves the standardization of construction products, materials and equipment.*

School Construction Features

Public School Construction Requirements Educational Specifications and District Standards



Isometric View

WALLS 5/8" thick type -"X" high impact gypsum wall board, with level 5 smooth finish, painted neutral color with eggshell acrylic finish.

FLOORING 1/8" thick rubber flooring. Provide a two- or three-color basic floor pattern to be approved by the District. Sheet goods may be used with the permission of the District.

CEILING 2' x 4' suspended grid premium acoustic lay-in tiles (Armstrong "Optima"), 10' high from finish floor minimum. suspended grid to have seismic hold down clips and uplift struts.

DAYLIGHT District Standard modular classroom operable window system with low-E laminated clear glass. Window coverings to be vinyl, electrically operated sunshades with 3% openness factor.

Clerestory windows, translucent white laminated glass with District Standard exterior perforated metal vandal-resistant screen (optional and site specific at the direction of the District).

WRITING SURFACES At front Learning Wall provide (3) 4' x 8' = 24 Lineal Feet (LF) at 24" depth max. horizontal sliding porcelain enameled steel whiteboards mounted at 34" Above Finished Floor (AFF) maximum with continuous chalk rail at bottom; tack strip, map hooks, and flag holder at top.

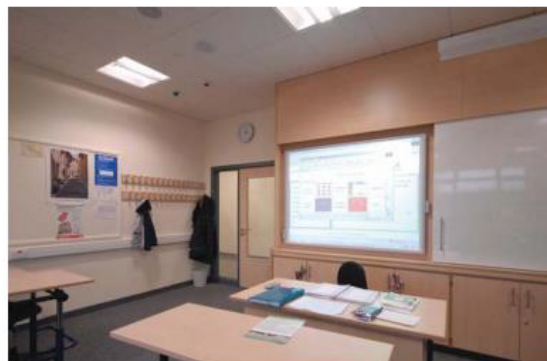
(1) 4' x 8' "Eno" board or approved interactive whiteboard
8 LF porcelain enameled steel whiteboard mounted at 34" AFF on wall opposite windows.

ACOUSTICAL TREATMENT Acoustical batt wall sound insulation in all interior walls (blown in may be used at existing walls). Walls to have 35dB with material assemblies that meet an STC rating of STC 60.

DISPLAY SPACE Vinyl wrapped tackable wall board (4' x 10' or 4' x 12' sheet, typical) mounted mounted full wall height. Vertical seams to be the wrapped edges of board, no exposed edges all edges to be wrapped. All walls to have vinyl wrapped tackable wall board where applicable.

Provide continuous wood chair rail at all walls mounted 34" AFF maximum (align with bottom of whiteboards). Detail with rabbited top edge to conceal the cut end of the tack board (optional and site specific at the direction of the District).

8' wide by 4'-6" high automatic recessed projection screen, in the down position to be located a minimum of 4'-6" from finished floor. Screen should not block "ENO" board, white boards or interactive boards.



Teaching Wall with Interactive Learning Board

JANUARY 2011 / PROJECT 1019700

Public School Construction Requirements

Educational Specifications and District Standards



Pinole Valley High School New Campus
West Contra Costa Unified School District

Abbreviations: ESA = Environmental Science Academy
 L & J = Law & Justice Academy
 HCA = Health Career Academy

6/9/2011

Teaching Stations	Dept	Room	Existing			Proposed			Notes
			Quantity	Sq. Ft.	Total Sq. Ft.	Quantity	Sq. Ft.	Total Sq. Ft.	
40	Core Academics								
		Standard Classroom							
		English	10	varies	10,538	10	1,070	10,700	1 ESA, 1 L&J, 1 HCA
		ELD	1	960	960	1	1,070	1,070	
		Foreign Language	8	varies	6,981	8	1,070	8,560	
		Math	9	varies	8,721	9	1,070	9,630	
		Social Studies	9	varies	9,369	8	1,070	8,560	2 ESA, 2 L&J, 1 HCA
		Law & Justice Academy	1	1,141	1,141	1	1,500	1,500	and share 3 regular classrooms
		Health Career Academy	1	960	960	1	1,500	1,500	and share 5 regular classrooms
		Environmental Science Academy	0	0	-	1	1,500	1,500	and share 4 regular classrooms
		Engineering Academy (Project Lead the Way)	0	0	-	1	1,500	1,500	
	<i>Sub-Total</i>			38,670			44,520		
6		Science Classroom							
		Multi-Use Lab (General Science)	4	1,090	4,360	4	1,600	6,400	2 ESA, 1 HCA
		Chemistry Lab	2	1,476	2,952	2	1,600	3,200	2 HCA
		Prep Room	4	188	752	3	300	900	
		Storage Room	2	69	138	3	80	240	
		<i>Sub-Total</i>			8,202			10,740	

School Construction Features

Public School Construction Requirements Educational Specifications and District Standards

PRIORITY CODES:
 G – GENERAL COMMENTS
 C – CHPS/HPI PRODUCTS
 SS – SOLE SOURCE PRODUCTS
 DS- DISTRICT STANDARD
 PP – PREFERRED PRODUCT
 OAE – OR APPROVED EQUAL

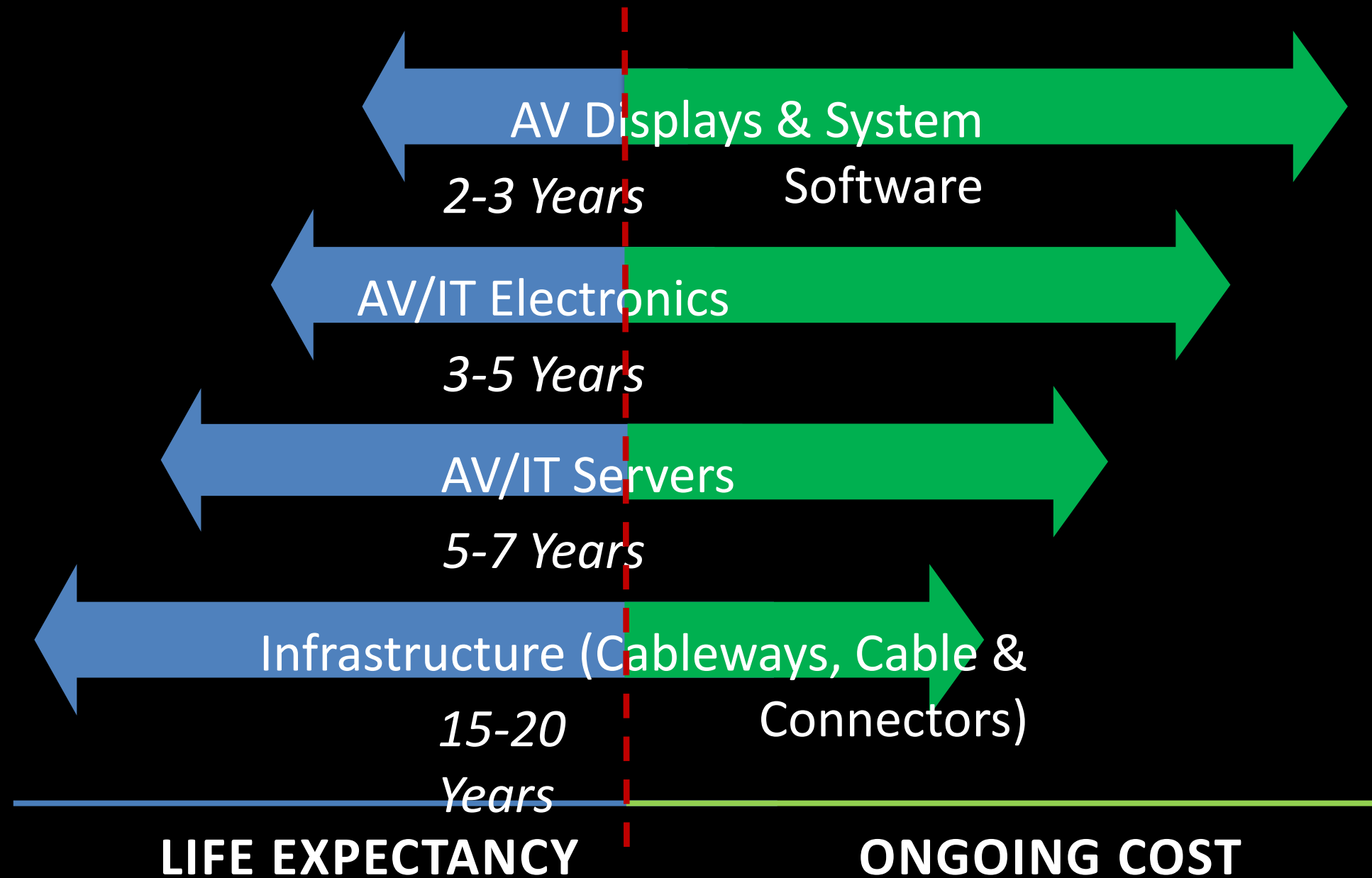
DISTRICT CODE	PRIORITY CODE	ITEM/USE TYPE	ELEMENTARY MIDDLE HIGH	PRODUCT DESCRIPTION	PRODUCT SERIES / MODEL NO.	MANUFACTURER, CONTACT, AND/OR SOURCE	CHPS ELIGIBILITY CRITERIA	MAXIMUM CHPS PTS	COMMENTS
	SS	Ductless Split Cooling System		Carrier 53 Series including outdoor condensing units and indoor ductless fan coils.	Carrier 53 Series	Carrier Corporation Distributor: E.B. Ward & Company (650) 872-5207	PO3.1		Used for small equipment rooms such as MDF rooms. Where roof penetrations are required, provide appropriate details.
	SS	High Efficiency Rooftop Gas Packaged A/C Unit		Carrier 48HJ Series. Complete with 2 inch filters, time delay relay, stainless steel heat exchanger, condenser coil corrosion resistant coating, factory roof curb (2 inch isolation curb if necessary).	Carrier 48HJ Series	Carrier Corporation Distributor: E.B. Ward & Company (650) 872-5207			For new construction only in locations such as library, computer, and media rooms. Where roof penetrations are required, provide appropriate details.
	SS	Large High Efficiency Rooftop Gas Packaged A/C Unit		Carrier 48PJ Centurion Series. Complete with 2 inch filters, time delay relay, stainless steel heat exchanger, condenser coil corrosion resistant coating, 2 inch isolation curb, Premierlink controls.	Carrier 48PJ Centurion Series	Carrier Corporation Distributor: E.B. Ward & Company (650) 872-5207			For theater, assembly/ multi-purpose rooms. Where roof penetrations are required, provide appropriate details.
		Gas-Fired Heating, Ventilating Unit			BPA Master Specification				For multi-purpose rooms and kitchen make-up air units. Where roof penetrations are required, provide appropriate details.
	LOQ		Elementary Middle High			Greenheck www.greenheck.com Norman S. Wright Mechanical Equip. Equipment Purchase: Stewart Bass (415) 467-7600 Parts Purchase: Sandy Crane (916) 381-6666 Sterling (413) 564-5540 E.B. Ward & Company (650) 872-5207	PO3.1		

School Construction Features

Public School Construction Requirements

Educational Specifications and District Standards

FUTURE-PROOFING



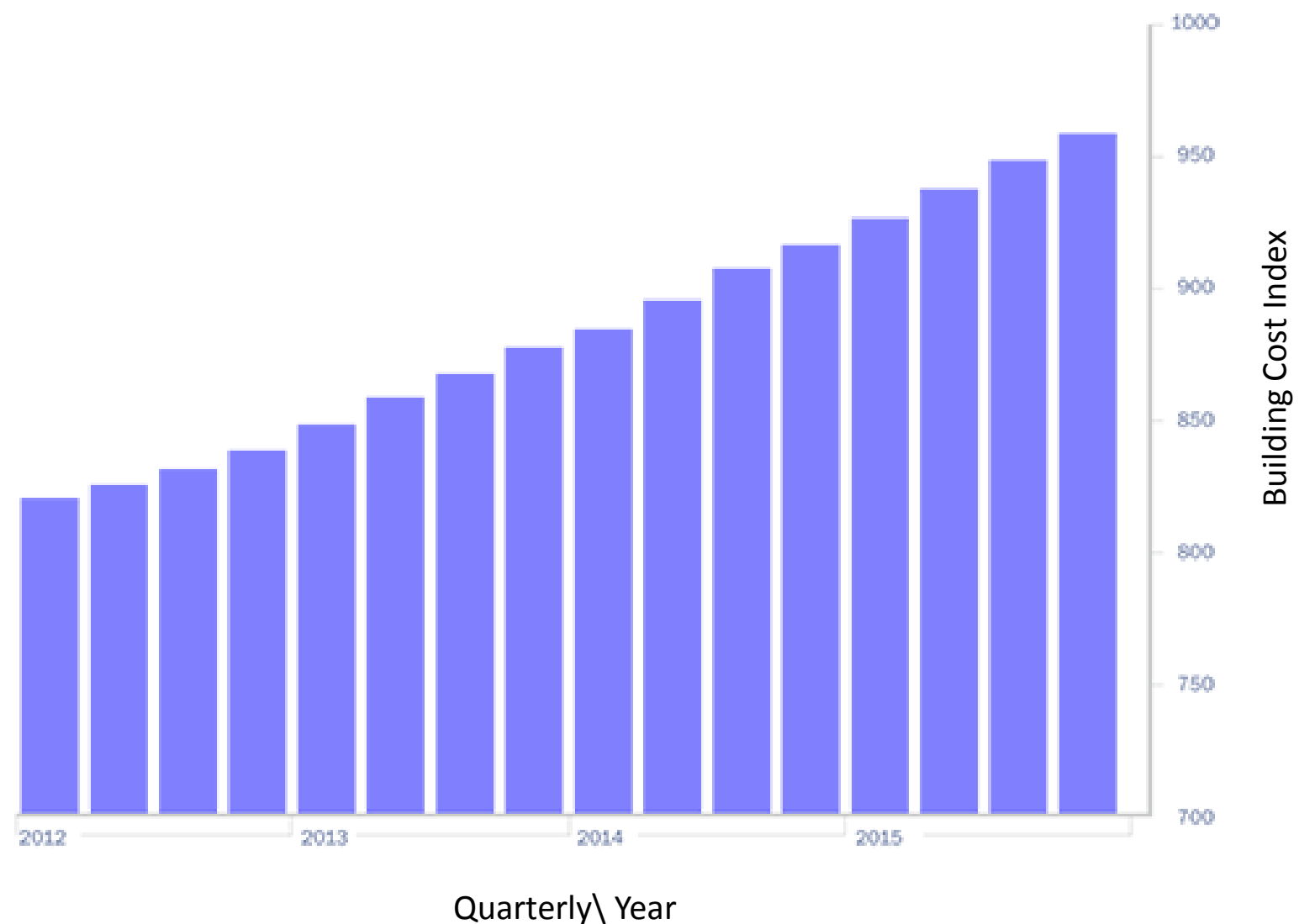
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Public School Construction Requirements

San Francisco Bay Area Construction Costs

“The high volume of work underway continues to put upward pressure on skilled labor. As a result, we are seeing subcontractors and vendors being more selective in their pursuits, which has driven selective trade cost increases. We are also seeing continued increases in material delivery lead times in response to market demands and limited availability of production and fabrication facilities. As market demands continue to grow, the lead time for material will also continue to grow.”

Attilio Rivetti
Vice President



Turner Construction Cost Index Analysis Yields 4.58% annually

School Construction Features

Public School Construction Requirements

San Francisco Bay Area Construction Costs

1. *San Francisco Bay Area Construction Costs:*
 - a. *Turner Construction Co. report on San Francisco Bay Area Construction Costs indicated an escalation of 4.58% annual increase every fourth Quarter. Highest in the State.*
 - b. *DSA school construction costs per square foot (2002 – 2012) is approximately \$463/ sq. ft.*
 - c. *The programs and features of WCCUSD schools are very comprehensive. Based on the historical construction costs, the District's construction costs are "on average" for comprehensive schools.*

School Construction Features

Public School Construction Requirements

District and Community Collaboration

1. *District and Community Collaboration (MOUs, Joint-Use Agreements):*
 - a. *District and Municipal Memorandum of Understandings (MOUs) provide community amenities such as supporting utility infrastructure, and public right of ways. (e.g.: storm water systems, roads, fencing to parks, etc.)*
 - b. *Joint-Use agreements between the District and various agencies, create partnerships for certain facilities. (e.g.: Performance Theaters, Baseball Fields, etc.)*

School Construction Features

Public School Construction Requirements Resulting in Beautiful Safe Schools



Thank You!

School Construction Features