BID ADDENDUM 1

AUGUST 12, 2021

San Rafael High School AD Building Remodel 150 Third Street San Rafael, California 94901

San Rafael City Schools 310 Nova Albion Way San Rafael. California 94903



This addendum shall supersede all previously issued specifications, addenda, and drawings wherein contradicts same. All other conditions remain unchanged. The following changes, modifications, corrections, clarifications, and / or additions as set forth herein shall apply to the above documents and shall be made a part thereof and shall be subject to all the requirements thereof as though originally specified and / or shown.

Notice Regarding Bid Documents: All bids shall be based on drawings and specifications date, with DSA approval stamp July 26, 2021, including this and subsequent addenda.

General:

- 1. Revised first floor (area B) classrooms to become a "Wellness Center"
 - a. Changes first floor Area B from Classrooms to Office spaces for the new "Wellness Center." Changes Classroom 4 to include a "Conference Room," "Waiting Area," "Staff" administration area, "Storage" rooms 140B & 139B and 3 "Counselor Offices." Changes "Breakout/Learning Spaces" 1 & 2 to 2 "Counselor Offices" (See A2.03)
 - b. Added (N) "Staff Restroom 147" in place of "Storage" room 152" (See A2.03)

Drawings:

- 1. Replacement Sheet A0.03:
 - a. Change of occupancy type from E to B in "Wellness Center" Area, includes addition of A occupancy at the new "Conference Room" and S-1 at new storage rooms. Revised "First floor code compliance plan" (See 28/A0.03)
 - b. Occupancy Load Calculation (Chart) revised (See A0.03)
- 2. Replacement Sheet A2.01:
 - a. A section of the First Floor Demolition Plan was revised per proposed "Wellness Center" design. See revised portion of the First Floor Demolition Plan (20/A2.01)
- 3. Replacement Sheet A2.03:
 - a. A section of the (Overall) First Floor Plan was revised per proposed "Wellness Center" design". See revised portion of the First Floor Plan (30/A2.03)

4. Replacement Sheet A3.20:

a. Section 30/A3.20 was revised per proposed "Wellness Center" design.

5. Sheet A3.30:

- Detail 8/A3.30 is no longer applicable in the proposed "Wellness Center" design. This
 detail has been replaced with detail 8/A9.04 (Wall Section at Conference Room
 Storefront).
- b. Storefront details have been added; 9/A9.04, 10/A9.04, 14/A9.04, and 15/A9.04.
- c. A Storefront Schedule has been added (See A9.04)

6. Replacement Sheet A4.01:

- a. A section of drawing 15/A4.01 "First Floor Detailed Plan Area B" was revised per proposed "Wellness Center". See revised portion of the "First Floor Detailed Plan Area B" (15/A4.01)
- b. Remove Panic Hardware from doors: 140A & 141A
- c. Corresponding Interior Elevations have been revised for the new "Conference Room", "Waiting Area", "Staff" Area and a typical "Counselor Office" (See A5.02).
- d. New "Staff Restroom 147" added (See 15/A4.01).

7. Replacement Sheet A5.02:

- a. Interior Elevations 1/A5.02, 2/A5.02, 3/A5.02, 4/A5.02, 6/A5.02, 7/A5.02, 8/A5.02, 9/A5.02, 10/A5.02, 11/A5.02, 12/A5.02 & 13/A5.02 were replaced by the following elevations: 6/A5.02, 8/A5.02, 9/A5.02, & 10/A5.02.
- b. Reception desk added at "Staff" area (141B). Detail for "Reception Desk" added (See 19/A9.03).
- c. Interior elevations and new keynotes for "Staff Restroom 147" were added (See 1/A5.02).

8. Replacement Sheet A6.01:

 A section of the First Floor Reflected Ceiling Demolition Plan (30/A6.01) was revised per proposed "Wellness Center" design. See revised portion of the First Reflected Ceiling Demolition Plan (30/A6.01)

9. Replacement Sheet A6.02:

- A section of the First Floor Reflected Ceiling Plan (20/A6.02) was revised per proposed "Wellness Center" design. See revised portion of the First Floor Reflected Ceiling Plan (20/A6.02)
- b. RCP Legend was revised to include new lighting fixtures.

10. Replacement Sheet A6.03:

- a. A section of the Reflected Ceiling Plan South (2/A6.03) was revised per proposed "Wellness Center" design. See revised portion of the Reflected Ceiling Plan South (2/A6.03)
- b. RCP Legend was revised to include new lighting fixtures.

11. Replacement Sheet A9.03:

- a. New "Grab Bar Detail" added. See 18/A9.03
- b. "Toilet Room Mounting Heights" detail added. See 6/A9.03
- c. "Accessible Lavatory" detail added. See 16/A9.03.
- d. "Accessible Toilet" detail added. See 26/A9.03.

12. Replacement Sheet A9.04:

- a. The Room Finish Schedule was revised per proposed "Wellness Center" design. New room names were added. Room numbers were revised to be in sequential order. Finish Schedule Key was revised to include new finish types. See revised Room Finish Schedule (A9.04)
- b. The door schedule was revised per proposed "Wellness Center" design. New room names added. Door numbers revised to be in sequential order. Hardware group numbers revised. New door typed added to Door legend. See revised door schedule (A9.04)
- c. New "Carpet to Epoxy Transition" Detail added (See 20/A9.04)
- d. New Detail for the "Ceramic Tile with Epoxy Resin Coved Base" condition in the "Staff Restroom 147". (See 13/A9.04).

13. Replacement Sheet A9.05:

- a. The Signage Schedule was revised per proposed "Wellness Center" design. New room names were added. Room numbers were revised to be in sequential order. See the revised Signage Schedule (A9.05).
- b. The First Level Signage Plan was revised per proposed "Wellness Center" design. New room names added. Door numbers revised to be in sequential order. See revised First Level Signage Plan (30/A9.05)

14. Replacement Sheet M0.2:

- a. Revised Fan Coil Unit Schedule and Branch Selector Box Schedule to reflect the changes shown on the floor plans.
- b. Revised the Supply Fan and Relief Fan CFM values for DOAS-AD2.

15. Replacement Sheet M1.1:

a. Revised demolition of existing ductwork and diffusers.

16. Replacement Sheet M2.1

- a. Added Keynotes 3 6.
- b. Revised Fan Coil unit tags to reflect new room numbering at Classrooms 150 152.
- c. M2.1: Revised fan coils and ductwork based on new floor plan layout.

17. Replacement Sheet M3.1:

- a. Added Keynote 5.
- b. Revised Fan Coil unit tags to reflect new room numbering at Classrooms 150 152.
- c. Revised fan coils, refrigerant piping and condensate piping based on new floor plan layout.

18. Replacement Sheet M6.3:

a. Revised Fan Coil unit tags to reflect new room numbering at Classrooms 150 – 152.

18: Replacement Sheet M6.4:

a. Revised piping and wiring diagrams to reflect the changes shown on floor plans and schedules.

19: New Sheet P0.1:

a. Staff Restroom 147": Plumbing legends, schedules, notes, and fixture schedule.

20. New Sheet P2.1:

a. "Staff Restroom 147": Plumbing: first floor plan.

21. New Sheet P4.1:

a. "Staff Restroom 147": Plumbing enlarged below and above floor first floor plans.

22. Replacement Sheet E0.01:

a. Replaces sheet E0.01. Added fixture types D, DE, F and G to fixture schedule.

23. Replacement Sheet E0.03:

- a. Replaces sheet E0.01. Made revisions to "Revised Panel 1B".
- b. Made revisions to "Existing Panel DB1-A".
- c. Added "Revised Panel DB1-A" panel schedule
- d. Made revisions to "Existing Panel BC1".
- e. Made revisions to "Existing Panel BC2".

24. Replacement Sheet E0.04:

a. Replaces sheet E0.04. Added detail five, "VONN LIGHTING PLAN AND SCHEDULE"

25. Replacement Sheet E2.01:

- a. Replaces sheet E2.01. Added fixtures at stairwells that need to be re-connected to existing circuits.
- b. Changed light fixtures in toilets and offices to remain.

26. Replacement Sheet E2.02:

a. Replaces sheet E2.02. Revised lighting in the Wellness Center area.

27. Replacement Sheet E3.01:

a. Replaces sheet E3.01. Changed power and data in toilets and offices to remain.

28. Replacement Sheet E3.02:

a. Replaces sheet E3.02. Revised power and data in the Wellness Center area.

29. Replacement Sheet E3.03:

a. Replaces sheet E3.03. Revised existing circuits to existing rooftop HVAC units.

30. Replacement Sheet E3.04:

- a. Replaces sheet E-3.04. Revised existing circuits to existing rooftop HVAC units.
- b. Revised circuits to new HVAC units.

31. Replacement Sheet E4.01:

- a. Replaces sheet E4.01. Revised scope of work area.
- b. Added existing intrusion alarm motion sensors and security camera.

32. Replacement Sheet E4.02:

a. Replaces sheet E4.02. Revised clock speaker and intrusion alarm in various rooms.

33. Replacement Sheet E5.02:

a. Replaces sheet E5.02. Revised fire alarm plan in Wellness Center Area.

- 34. Replacement Sheet E6.01:
 - Replaces sheet E6.01. Revised bill of materials and voltage drop calculations for fire alarm devices.
- 35. Replacement Sheet E6.02:
 - a. Replaces sheet E6.02. Revised fire alarm riser diagram.

Specifications:

- 1. New Section 06 06 60: Plastic Fabrications
 - a. Specifications for plastic panels in "Conference Room" aluminum storefront wall.
- 2. New Section 08 41 13: Aluminum Entrances and Storefronts
 - a. Specifications for "Conference Room" aluminum storefront wall.
- 3. Replacement Section 08 71 00: Door Hardware
 - a. Updated hardware schedule for all doors affected by the change in room use.
- 4. New Section 09 30 13: Ceramic Tile
 - a. Specifications for ceramic tile in "Staff Restroom 147."
- 5. New Section 09 67 01: Fluid-Applied Epoxy Flooring
 - a. Specifications for epoxy flooring in "Staff Restroom 147."
- 6. New Section 10 28 00, Toilet and Bath Accessories Specifications
 - a. Specifications for accessories in "Staff Restroom 147."
- 7. New Section 22 00 50: Basic Plumbing Materials and Methods
 - a. Specifications for "Staff Restroom 147."
- 8. New Section 22 10 00: Plumbing Piping Systems
 - a. Specifications for "Staff Restroom 147."
- 9. New Section 22 40 00: Plumbing Fixtures
 - a. Specifications for "Staff Restroom 147."

Attachments: Drawings

- A0.01 Title Sheet
- A0.03 Fire Life Safety & Code Analysis Floor Plan
- A2.01 Demolition Plan
- A2.03 Overall Floor Plan
- A3.20 Building Sections
- A4.01 Enlarged Floor Plans

- A5.02 Interior Elevations
- A6.01 Demolition RCP
- A6.02 Reflected Ceiling Plan
- A6.03 Enlarged Reflected Ceiling Plan
- A9.03 Interior Details
- A9.04 Finish & Door Schedule
- A9.05 Sign Schedule & Details
- M0.2, Mechanical Schedules
- M1.1, Mechanical First Floor Demolition Plan
- M2.1, Mechanical First Floor Plan
- M3.1, Mechanical First Floor Piping Plan
- M6.3, Mechanical Piping & Wiring Diagrams
- M6.4, Mechanical Piping & Wiring Diagrams
- P0.1, Plumbing Legends, Schedules, Notes, and Fixture Schedule
- P2.1, Plumbing First Floor Plan
- P4.1, Plumbing Enlarged Below and Above Floor First Floor Plans
- E0.01, Electrical Symbols, Notes and Schedules
- E0.03, Electrical Panel Schedules
- E0.04, Electrical Details
- E2.01, Electrical Demolition Lighting Plan
- E2.02, Electrical Lighting Plan
- E3.01, Electrical Demolition Power and Data Plan
- E3.02, Electrical Power and Data Plan
- E3.03, Electrical Roof Demolition Power Plan
- E3.04, Electrical Roof Power Plan
- E4.01, Electrical Demolition Signal Plan
- E4.02, Electrical Signal Plan
- E5.02, Electrical Fire Alarm Plan
- E6.01, Electrical Fire Alarm Notes, Details and Schedules
- E6.02, Electrical Fire Alarm Riser Diagrams

Attachments: Specifications

Section 06 06 60, Plastic Fabrications

Section 08 41 13, Aluminum Entrances and Storefronts

Section 08 71 00, Door Hardware

Section 09 30 13, Ceramic Tile

Section 09 67 01, Fluid-Applied Epoxy Flooring

Section 10 28 00, Toilet and Bath Accessories

Section 22 00 50, Basic Plumbing Materials and Methods

Section 22 10 00, Plumbing Piping Systems

Section 22 40 00, Plumbing Fixtures



APPLICATION FOR SUBMITTAL OF POST-APPROVAL DOCUMENT

This application is for submittal of documents, after the initial approval of the project (post-approval documents), that require Division of the State Architect (DSA) review and approval. This form shall be completed by the Design Professional in General Responsible Charge of the project, in accordance with California Code of Regulations, Title 24, Part 1, Sections 4-317, 4-323 and 4-338 and in compliance with DSA IR A-6: Construction Change Document Submittal and Approval Process.

DSA documents referenced within this form are available on the DSA Forms or DSA Publications webpages.

1. SUBMITTAL TYPE: (Is this a resubmittal? Yes□ No □)								
Deferred Submittal □ Addendum Number: R	evision Number:	CCD Num	nber:	Category A □ or B □				
2. PROJECT INFORMATION:		<u> </u>						
School District/Owner:			DSA File Numbe	er:				
Project Name/School:			DSA Application	Number: 01				
3. APPLICANT INFORMATION:								
Date Submitted:	Attached Pages?	No □ Yes □ Numb	per of pages?					
Firm Name:	Contact Name:							
Work Email:	Work Phone:			T				
Firm Address:	City:		State:	Zip Code:				
4. REASON FOR SUBMITTAL: (Check applicable boxes)								
☐ For revision or addendum prior to construction.		☐ For a	project currently u	nder construction.				
☐ For a project that has a form DSA 301-N: Notification of Require a 90-Day Letter issued.	rement for Certification, L	DSA 301-P: Posted	Notification of Re	equirement for Certification or				
\square To obtain DSA approval of an existing uncertified building or b	uildings.							
\square For Category B CCD this is: \square a voluntary submittal, \square a DSA	required submittal (attac	h DSA notice requi	ring submission).					
5. DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CH	IARGE:							
Name of the Design Professional In General Responsible Charge	:							
Professional License Number:	Discipline:							
Design Professional in General Responsible Charge Stateme and appear to meet the appropriate requirements of Title 24, Cali incorporation into the construction of the project. Signature: DESIGN PROFESSIONAL IN GE		ns and the project s						
6. CONFIRMATION, DESCRIPTION AND LISTING OF DOCUM	IENTS:							
For addenda, revisions, or CCDs: CHECK THIS BOX to confirm that all post-approval documents have been stamped and signed by the Responsible Design Professional listed on form DSA 1: Application for Approval of Plans and Specifications for this project. (For Deferred Submittals, refer to IR A-18: Use of Construction Documents Prepared by Other Professionals, and IR A-19: Design Professional's Signature and Seal (Stamp) on Construction Documents, when applicable, for signature and seal requirements.)								
Provide a brief description of construction scope for this post-app	roval document (attach a	additional sheets if i	needed):					
List of DSA-approved drawings affected by this post-approval doc	cument:							
E3.01, E3.02, E3.03, E3.04, E4.01, E4.02, E5.02, E6.01, E6.02	DOA HOE ONLY							
	DSA USE ONLY	Returned	D	SA STAMP				
SSS MLee Date 10/19/21 MApproved □Disapprove	d □Not Required D	ate:						
I	B	y:						
Comments:			/i	APPROVED \				
Comments:Date□Approved □Disapprove Comments:			APP: 0	APPROVED THE STATE ARCHITECT 1-119449 INC: REVIEWED FOR FLS ACS				

1/8" = 1'-0"

3/4" = 1'-0"

1" = 1'-0"

1 1/2" = 1'-0"

SAN RAFAEL HIGH SCHOOL AD BUILDING REMODEL

SAN RAFAEL CITY SCHOOLS

150 3RD STREET, SAN RAFAEL, CA 94901

FILE: 21-H1 APPL: 01-119449

3" = 1'-0"





Client Project Number:

Drawn By: NM

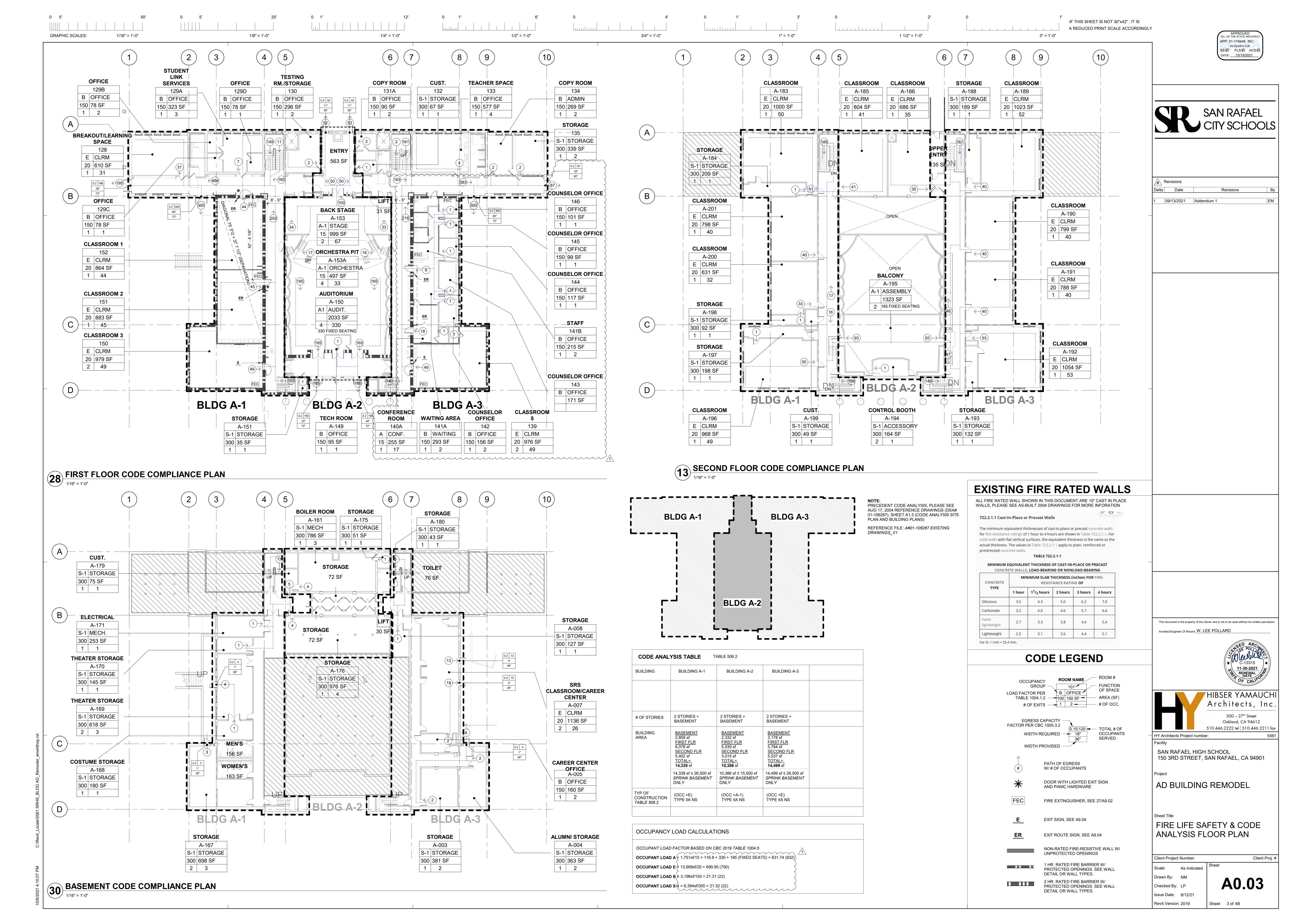
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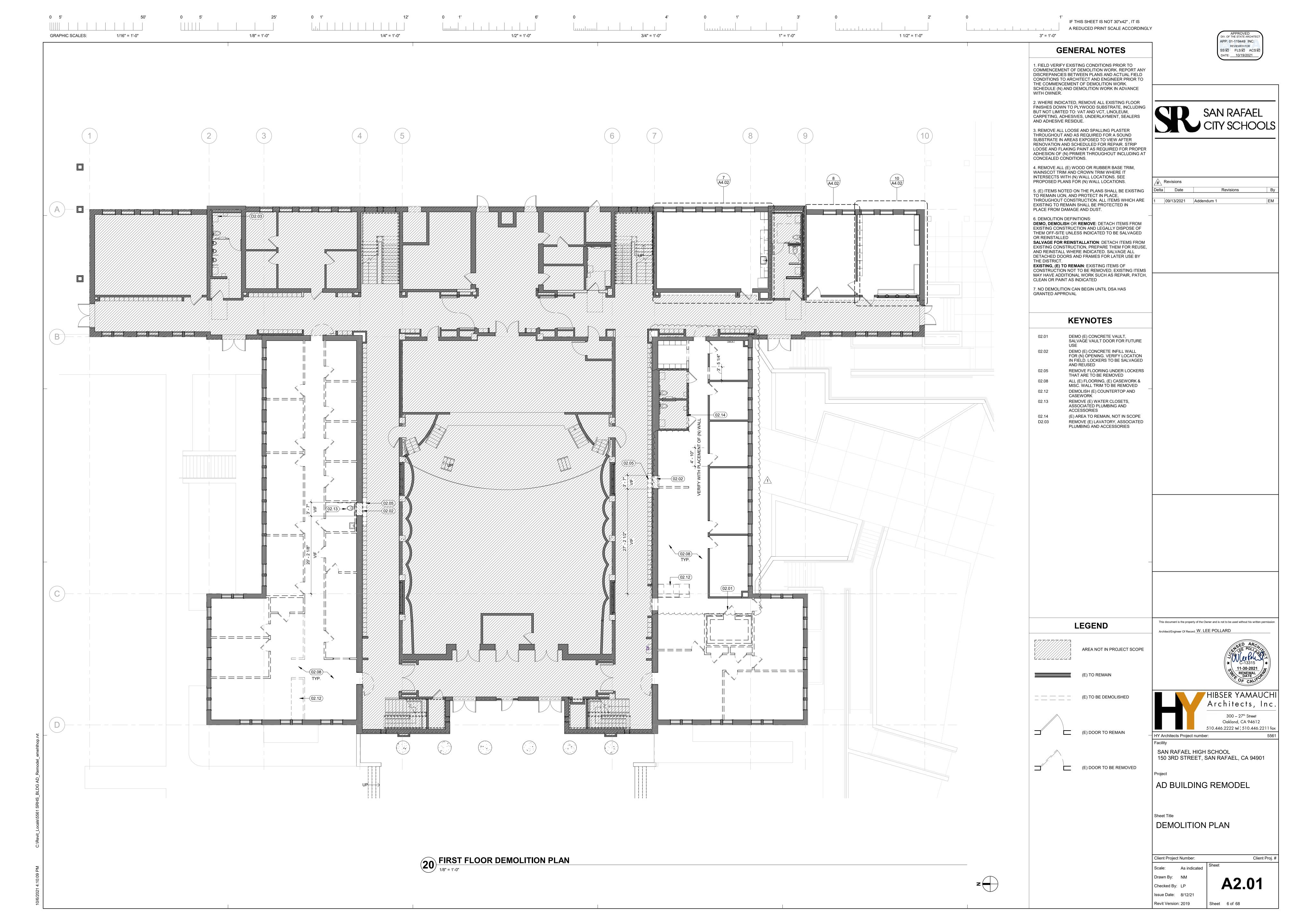
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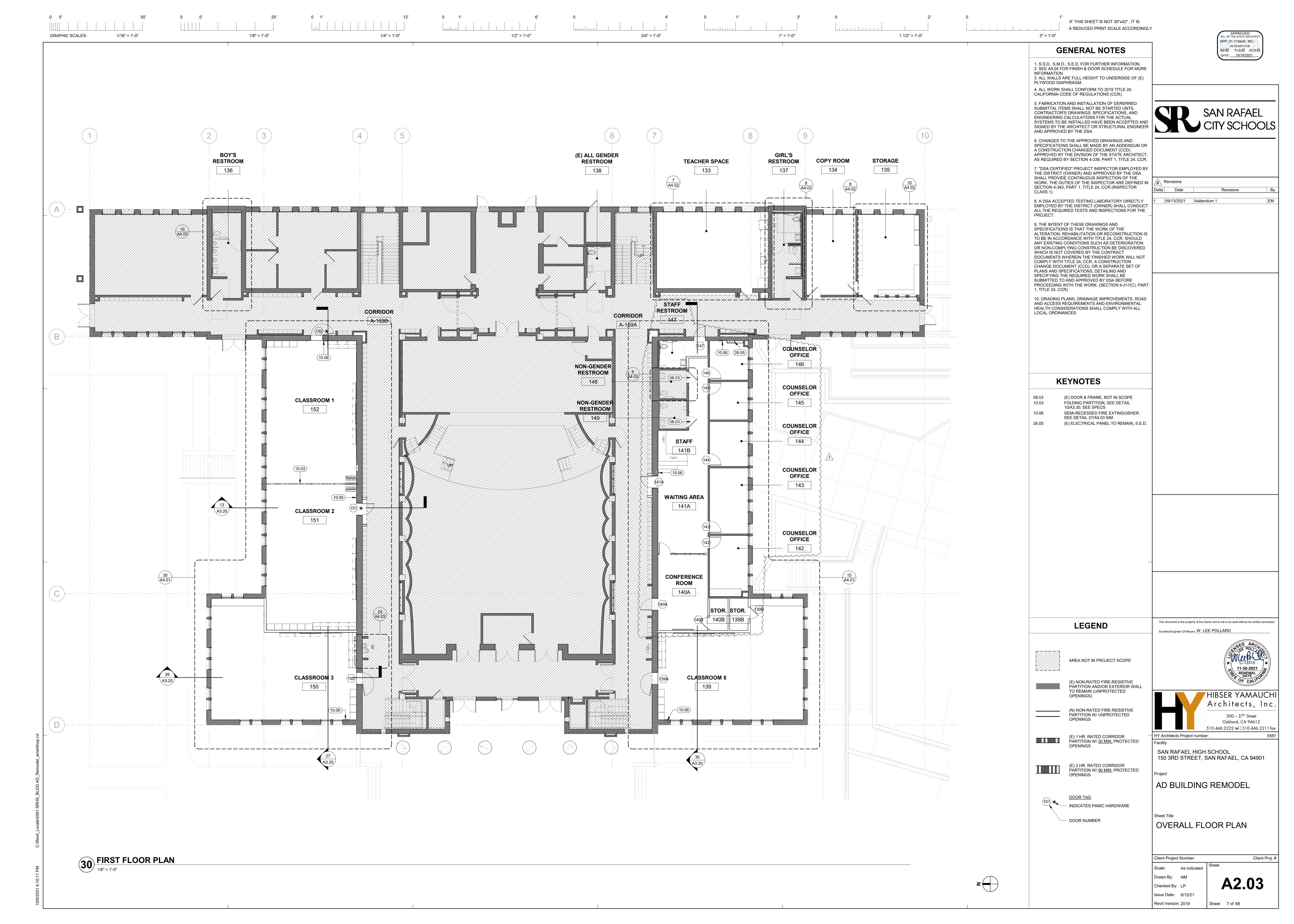
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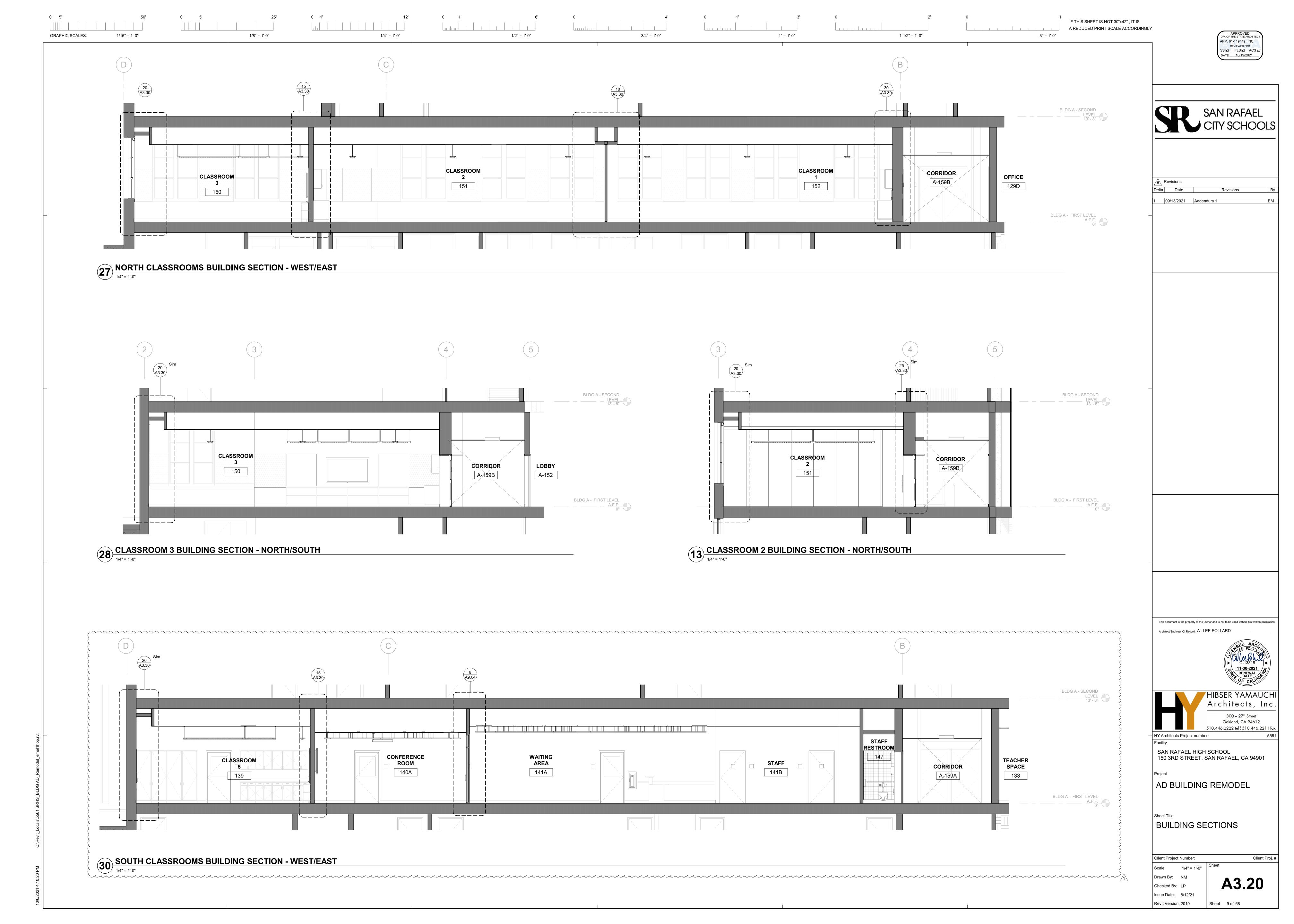
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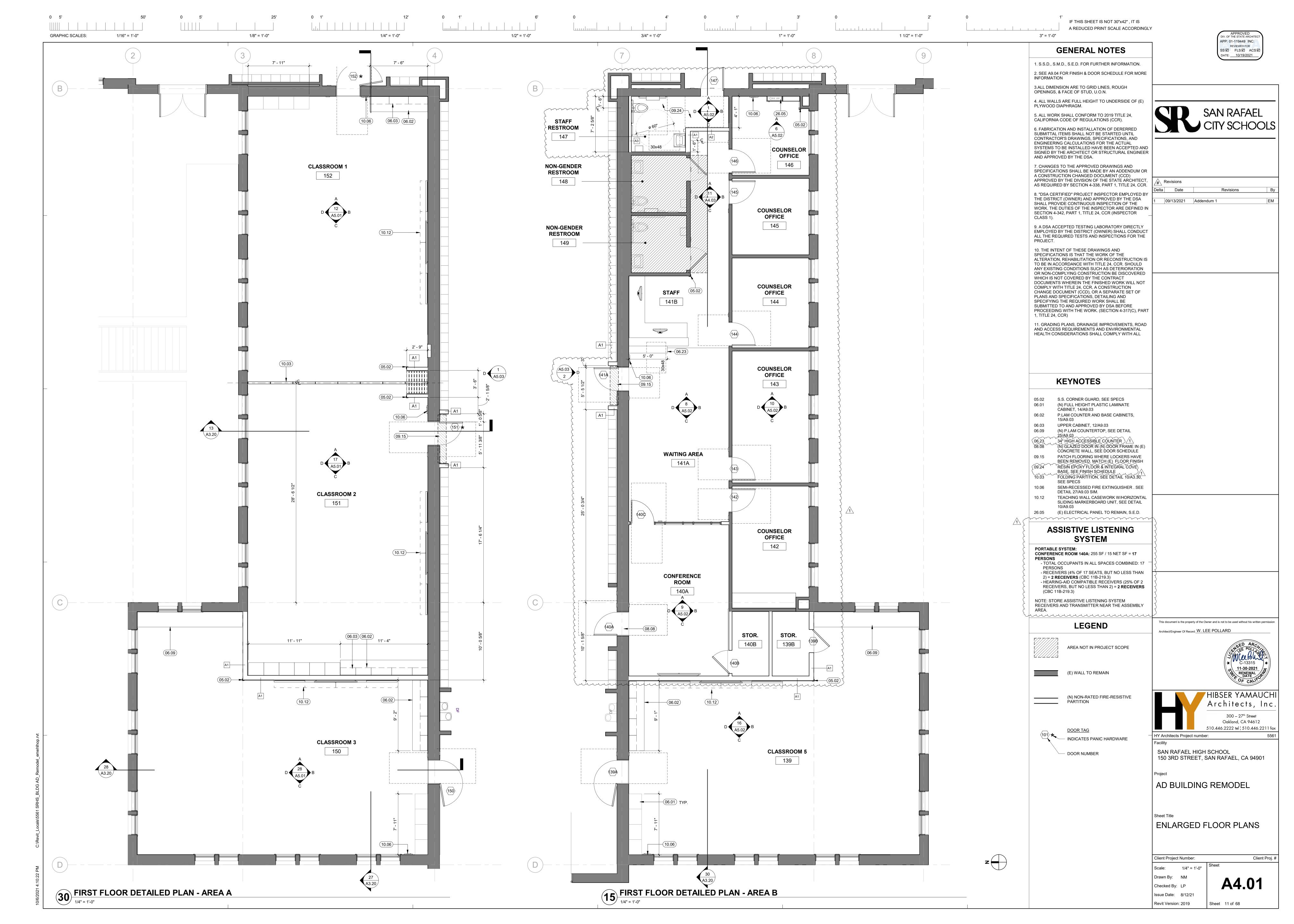
GENERAL NOTES INDEX OF DRAWINGS APPLICABLE CODES **OWNER** STATEMENT OF GENERAL CONFORMANCE Revisions BELOW IS A STATEMENT OF GENERAL CONFORMANCE IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO SEE TO IT THAT ALL MATERIALS AND/OR SAN RAFAEL CITY SCHOOLS Revisions AS PER DSA IR A-18 AND/OR IR A-19: WORK DESCRIBED, DEPICTED OR DETAILED WITHIN THESE DOCUMENTS, BE FURNISHED AND OR ARCHITECTURAL ALL WORK PERFORMED UNDER THIS CONTRACT IS TO CONFORM TO THE FOLLOWING 310 NOVA ALBION WAY TEL. (415) 492-3285 INSTALLED REGARDLESS OF THE LOCATION OF THAT MATERIAL OR WORK WITHIN THE DOCUMENTS A0.01 TITLE SHEET CODES AND REGULATIONS: 09/13/2021 Addendum 1 SAN RAFAEL, CA 94903 OR OMISSION (WHETHER DELIBERATE OR ACCIDENTAL) OF THAT MATERIAL OR WORK BY A FAX. (415) 492-3229 FOR ARCHITECTS/ENGINEERS WHO UTILIZE PLANS, INCLUDING BUT NOT LIMITED TO SHOP SYMBOLS, LEGENDS AND ABBREVIATIONS DIRECTOR OF CAPITAL FACULTIES: DAN ZAICH DRAWINGS, PREPARED BY OTHER LICENSED DESIGN PROFESSIONALS AND/OR CONSULTANTS SUBCONTRACTOR ON HIS/HER BID. 2019 CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE, FIRE LIFE SAFETY & CODE ANALYSIS FLOOR PLAN PART 1, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR) SAN RAFAEL HIGH SCHOOL ACCESSIBILITY SITE PLAN . ALL CONTRACTORS, WHETHER THE GENERAL OR SUB. SHALL CONSIDER THESE DOCUMENTS IN 01-119449 **APPLICATION NO.** THEIR ENTIRETY. DISCREPANCIES OR CONTRADICTIONS BETWEEN PORTIONS OF THESE DOCUMENTS **EMERGENCY VEHICLE ACCESS PLAN** 150 THIRD STREET TEL. (415) 485-2330 2019 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24, CCR BASED ON THE MUST BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AT LEAST 48 HRS PRIOR TO BID OPENING **DEMOLITION PLAN** SAN RAFAEL, CA 94901 2018 INTERNATIONAL BUILDING CODE (IBC) FOR CLARIFICATION. OTHERWISE EITHER DESCRIPTION OR INSTRUCTION SHALL BE IN FORCE UNTIL 1) DESIGN INTENT AND APPEARS TO MEET THE APPROPRIATE REQUIREMENTS OF TITLE 24, PRINCIPAL: GLEN DENNIS **OVERALL FLOOR PLAI** ONE IS OMITTED BY THE ARCHITECT, AT NO ADDITIONAL COST TO THE OWNER. CALIFORNIA CODE OF REGULATIONS AND THE PROJECT SPECIFICATIONS PREPARED BY ME, AND **2019 CALIFORNIA ELECTRICAL CODE (CEC)**, PART 3, TITLE 24, CCR BASED ON THE A2.04 PROGRAM MANAGER 2) COORDINATION WITH MY PLANS AND SPECIFICATIONS AND IS ACCEPTABLE FOR 2018 NATIONAL ELECTRICAL CODE (NEC) A3.20 **BUILDING SECTIONS** THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND MAINTAINING TEMPORARY FENCING AND INCORPORATION INTO THE CONSTRUCTION OF THIS PROJECT. **GREYSTONE WEST COMPANY** TEL. (707) 933-0624 A3.30 GATES, SIGNAGE, SECURITY LIGHTING OR OTHER SECURITY AND CONTROL MEASURES NECESSARY **2019 CALIFORNIA MECHANICAL CODE (CMC)**, PART 4, TITLE 24, CCR BASED ON THE 621 WEST SPAIN STREET, FAX. (707) 996-8390 TO PROVIDE FOR THE SAFETY OF STUDENTS, FACULTY AND STAFF AROUND THE WORK, UNTIL THE THE STATEMENT OF GENERAL CONFORMANCE SHALL NOT BE CONSTRUED AS RELIEVING ME OF SONOMA, CA 95476 COMPLETION OF THE WORK UNLESS OTHERWISE DETERMINED BY THE ARCHITECT OR MY RIGHTS, DUTIES, AND RESPONSIBILITIES UNDER SECTIONS 17302 AND 81138 OF THE ENLARGED FLOOR PLANS CONTACT: JOHN DILENA EDUCATION CODE AND SECTIONS 4-336, 4-341 AND 4-344" OF TITLE 24, PART 1. (Title 24, PART1, **ENLARGED FLOOR PLANS 2019 CALIFORNIA PLUMBING CODE (CPC)**, PART 5, TITLE 24, CCR BASED ON THE SECTION 4-317 [B]) **CONSULTANTS** f 4. THE CONTRACTOR IS RESPONSIBLE TO REPAIR AND/OR REPLACE ALL DISTRICT $\,$ PROPERTY DAMAGED DURING THE COURSE ON THE WORK, ESPECIALLY BUT NOT LIMITED TO ASPHALT PAVING **2019 CALIFORNIA ENERGY CODE**, PART 6, TITLE 24 CCR AROUND THE SITE, STAGING AREA OR PATH OF TRAVEL TO EITHER. [X] ALL STRUCTURAL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS LISTED ON THE COVER SHEET ARCHITECT 2016 SAFETY CODE FOR ELEVATORS AND ESCALATORS 5. THE CONTRACTOR SHALL LIMIT HIS/HER ACTIVITY TO THE AREA DESCRIBED WITHIN THE DOCUMENTS REFLECTED CEILING PLAN SO AS TO LIMIT HIS/HER LIABILITY FOR DAMAGED PROPERTY UNLESS OTHERWISE PERMITTED BY THE HIBSER YAMAUCHI ARCHITECTS, INC. ENLARGED REFLECTED CEILING PLAN CONSTRUCTION MANAGER OR OWNER. 300 27TH STREET, 2ND FLOOR 2019 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24, CCR BASED ON THE TEL. (510) 446-2222 INTERIOR WALL TYPES & DETAILS OAKLAND, CA 94612 FAX (510) 446-2211 6. ALL WORK SHALL BE IN ACCORDANCE WITH REQUIREMENTS OF ALL APPLICABLE CODES. SEE LIST INTERIOR DETAILS - SUSPENDED ACOUSTIC CEILING DETAILS [X] ARE IN GENERAL CONFORMANCE WITH THE PROJECT DESIGN INTENT, AND CONTACT: PETER ENGEL INTERIOR DETAILS A9.03 **2019 CALIFORNIA EXISTING BUILDING CODE**, PART 10, TITLE 24 CCR A9.04 FINISH & DOOR SCHEDULE (2018 IEB CODE AND CALIFORNIA AMENDMENTS) [X] HAVE BEEN COORDINATED WITH THE PROJECT PLANS AND SPECIFICATIONS 7. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS PRIOR TO COMMENCEMENT A9.05 SIGN SCHEDULE & DETAILS STRUCTURAL OF CONSTRUCTION EXCEPT DSA APPROVAL. 2019 CALIFORNIA GREEN BUILDING CODE (CALGreen), PART 11, TITLE 24, CCR ZFA STRUCTURAL ENGINEERS TEL. (415) 243-4091 8. ALL DIMENSIONS SHALL BE FACE OF STUD, UNLESS OTHERWISE NOTED. DIMENSIONS NOTED AS STRUCTURAL 601 MONTGOMERY STREET, #1450 **2019 CALIFORNIA REFERENCED STANDARDS**, PART 12, TITLE 24 CCR "CLR" MEAN CLEAR DIMENSION TO FACE OF FINISH. VERIFY ALL EXISTING DIMENSIONS AND **GENERAL NOTES AND SPECIFICATIONS** SAN FRANCISCO, CA 94111 SIGNATURE OF THE ARCHITECT/ENGINEER DATE CONDITIONS AND NOTIFY ARCHITECT OF ANY DISCREPANCIES FOUND. **CONTACT: ANGIE SOMMER** TYPICAL CFS DETAILS TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS DESIGNATED TO BE IN GENERAL RESPONSIBLE CHARGE TYPICAL MISCELLANEOUS DETAILS 9. ALL ITEMS IN THESE DRAWINGS ARE NEW UNLESS OTHERWISE NOTED FIRST FLOOR FRAMING PLAN 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN W.LEE POLLARD C-13315 11-30-2021 MECHANICAL / PLUMBING 10. SCHEDULE ALL WORK OUTSIDE THE "EXTENT OF WORK" SET FORTH IN THESE DOCUMENTS WITH THE SECOND FLOOR FRAMING PLAN CAPITAL ENGINEERING CONSULTANTS TEL. (916) 851-3500 CONSTRUCTION MANAGER INCLUDING ACCESS AND STORAGE. THE CONSTRUCTION SCHEDULE 2016 EDITION ROOF FRAMING PLAN 11020 SUN CENTER DRIVE, SUITE 100 INSTALLATION OF STANDPIPE SYSTEMS 2019 EDITION SHALL BE APPROVED BY THE OWNER PRIOR TO THE START OF CONSTRUCTION. RANCHO CORDOVA, CA 95670 S5.1 DETAILS STANDARD FOR DRY CHEMICAL EXTINGUISHING SYS. 2017 EDITION CONTACT: TOM DUVAL I1. ALL UTILITIES REQUIRED FOR THE CONTINUOUS OPERATION OF ALL EXISTING FACILITIES TO REMAIN STANDARD FOR WET CHEMICAL SYS. INSTALLATION OF STATIONARY PUMPS 2019 EDITION MUST BE MAINTAINED IN SERVICE AT ALL TIMES. ANY SHUT DOWNS FOR NEW CONNECTIONS MUST BE COORDINATED WITH THE CONSTRUCTION MANAGER TWO WEEKS PRIOR TO THE REQUESTED INSTALLATION OF PRIVATE FIRE MAINS 2019 EDITION MECHANICAL LEGENDS & GENERAL NOTES ELECTRICAL / COMMUNICATIONS NFPA 72 NATIONAL FIRE ALARM AND SIGNALING CODE 2016 EDITION MECHANICAL SCHEDULES NFPA 80 FIRE DOORS AND OTHER OPENING PROTECTIVES 2019 EDITION WKM ELECTRICAL CONSULTANTS MECHANICAL FIRST FLOOR DEMOLITION PLAN STANDARD FOR SMOKE CONTROL SYSTEMS 12. THE CONTRACTOR IS RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ANY ITEMS DAMAGED 2018 EDITION 3397 MT. DIABLO BLVD., SUITE C MECHANICAL ROOF DEMOLITION PLAN NFPA 253 OR DISTURBED DURING THE COURSE OF THE WORK. INSTALLATION SHALL MATCH EXISTING IN KIND, CRITICAL RADIANT FLUX OF FLOOR COVERING SYS 2019 EDITION LAFAYETTE, CA 94549 MECHANICAL FIRST FLOOR PLAN CLEAN AGENT FIRE EXTINGUISHING SYSTEM 2018 EDITION CONTACT: TIFFANY KANE MECHANICAL ROOF PLAN REFERENCE CODE SECTIONS FOR APPLICABLE STANDARDS - 2019 CBC CHAPTER 35 AND 13. THE CONTRACTOR SHALL CONTAIN ALL DUST AND DEBRIS TO THE CONSTRUCTION AREA. BROOM MECHANICAL FIRST FLOOR PIPING PLAN CLEAN ALL SIDEWALKS AND DRIVEWAYS EACH DAY. KEEP DIRT AND DUST TO A MINIMUM. MECHANICAL DETAILS MECHANICAL DETAILS 14. ALL REMODELED ITEMS LISTED TO BE SALVAGED FOR THE OWNER SHALL BE DELIVERED TO A PLACE THE ABOVE CODES AND REGULATIONS REFER TO THE LATEST EDITION OR REVISION IN MECHANICAL CONTROL DIAGRAMS OF STORAGE AS DIRECTED BY THE OWNER. ALL OTHER ITEMS MUST BE DISPOSED OF OFF SITE IN A FORCE ON THE DATE OF THE CONTRACT, UNLESS OTHERWISE STATED. NOTHING ON THE MECHANICAL CONTROL DIAGRAMS DRAWINGS IS TO BE CONSTRUED AS REQUIRING OR PERMITTING WORK THAT IS CONTRARY TO THE LISTED CODES AND REGULATIONS, OR OTHER LOCAL, STATE OR MECHANICAL PIPING & WIRING DIAGRAMS 15. ALL WORK SHALL BE EXECUTED IN A CAREFUL AND ORDERLY MANNER WITH THE LEAST POSSIBLE FEDERAL CODES OR REGULATIONS WHICH MAY BE APPLICABLE. MECHANICAL PIPING & WIRING DIAGRAMS DISTURBANCE TO THE PUBLIC AND TO OCCUPANTS OF EXISTING BUILDINGS. MECHANICAL TITLE 24 DOCUMENTATION COMPLIANCE WITH CFC CHAPTER 33, FIRE SAFETY DURING CONSTRUCTION AND $\overline{}$ 16. THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE SAFETY OF ALL PERSONS ON OR DEMOLITION, AND CBC CHAPTER 33, SAFETY DURING CONSTRUCTION WILL BE PLUMBING ABOUT THE CONSTRUCTION SITE, IN ACCORDANCE WITH APPLICABLE LAWS AND CODES. GUARD ALL HAZARDS IN ACCORDANCE WITH THE SAFETY PROVISIONS OF THE LATEST MANUAL OF ACCIDENT PLUMBING LEGENDS, SCHEDULES, NOTES, AND FIXTURE SCHEDULE PREVENTION PUBLISHED BY THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA. PLUMBING FIRST FLOOR PLAN P4.1 PLUMBING ENLARGED BELOW AND ABOVE FLOOR FIRST FLOOR PLAN A. COORDINATION WITH OTHER CONTRACTS: IF ANY PART OF THIS CONTRACTOR'S WORK DEPENDS UPON THE WORK OF A SEPARATE CONTRACTOR, THIS CONTRACTOR SHALL INSPECT SUCH OTHER WORK AND PROMPTLY REPORT IN WRITING TO THE CONSTRUCTION MANAGER ANY DEFECTS IN ADMINISTRATIVE REQUIREMENTS E0.01 ELECTRICAL SYMBOLS, NOTES AND SCHEDULES SUCH OTHER WORK THAT RENDER IT UNSUITABLE TO RECEIVE THE WORK OF THIS CONTRACTOR FAILURE OF THIS CONTRACTOR TO SO INSPECT AND REPORT SHALL CONSTITUTE AN ACCEPTANCE ELECTRICAL ONE-LINE DIAGRAM OF THE OTHER CONTRACTOR'S WORK, EXCEPT AS TO DEFECTS WHICH MAY DEVELOP IN OTHER ELECTRICAL PANEL SCHEDULES CONTRACTOR'S WORK AFTER EXECUTION OF THIS CONTRACTOR'S WORK. THE INTENT OF THE DRAWINGS AND SPECIFICATIONS IS TO MODERNIZE EXISTING CLASSROOM AND ELECTRICAL DETAILS ADMINISTRATION BUILDINGS IN AN EXISTING ELEMENTARY SCHOOL CAMPUS IN ACCORDANCE WITH ELECTRICAL DETAILS B. COORDINATION SCHEDULE: PORTIONS OF WORK UNDER THIS CONTRACTOR'S WORK MUST BE TITLE 24, CALIFORNIA CODE OF REGULATIONS. SHOULD ANY CONDITIONS DEVELOP NOT COVERED ELECTRICAL DETAILS COMPLETED ON SCHEDULE IN ORDER FOR OTHER NOT-IN-CONTRACT WORK TO BE COMPLETED BY THE CONTRACT DOCUMENTS SUCH THAT THE FINISHED WORK WILL NOT COMPLY WITH THE SAID BY OTHERS. COORDINATION WITH THE CONSTRUCTION MANAGER AND STRICT ADHERENCE TO ELECTRICAL DETAILS TITLE 24, CALIFORNIA CODE OF REGULATIONS, CONSTRUCTION DOCUMENT(S) DETAILING AND THE COMPLETION DATES FOR DESIGNATED PORTIONS OF WORK ARE IMPERATIVE. SEE ELECTRICAL DETAILS SPECIFYING THE REQUIRED WORK SHALL BE SUBMITTED AND APPROVED BY DSA BEFORE SPECIFICATIONS FOR LIQUIDATED DAMAGES. PROCEEDING WITH THE WORK ELECTRICAL TITLE 24 INTERIOR LIGHTING ELECTRICAL LIGHTING AND POWER SITE PLAN 7. DEMOLITION IS NOT NECESSARILY LIMITED TO ONLY WHAT IS SHOWN ON THIS OR OTHER DRAWINGS . A COPY OF PARTS 1 AND 2, TITLE 24 C.C.R. SHALL BE KEPT ON THE JOB SITE AT ALL TIMES DURING OR AS OUTLINED IN THE SPECIFICATIONS. THE INTENT IS TO INDICATE GENERAL SCOPE OF ELECTRICAL SIGNAL SITE PLAN ELECTRICAL DEMOLITION LIGHTING PLAN DEMOLITION REQUIRED TO COMPLETE THE PROJECT WITH THE CONSTRUCTION DOCUMENTS. VICINITY MAP NO SCALE **EXISTING CONDITIONS** E2.02 ELECTRICAL LIGHTING PLAN ALL CONSTRUCTION CHANGE DOCUMENTS AND ADDENDA TO BE SIGNED BY THE ARCHITECT AND THE 18. ARCHITECT IS NOT RESPONSIBLE FOR THE DISCOVERY, PRESENCE, HANDLING, REMOVAL OR OWNER AND APPROVED BY DSA. CONSTRUCTION CHANGE DOCUMENT(S) ARE NOT VALID UNTIL ELECTRICAL DEMOLITION POWER AND DATA PLAN DISPOSAL OF, OR EXPOSURE OF PERSONS TO, HAZARDOUS MATERIALS OR TOXIC SUBSTANCES IN APPROVED BY DSA PER SECTION 4-338, PART 1, TITLE 24. ELECTRICAL POWER AND DATA PLAN ANY FORM AT THE PROJECT SITE. TO THE EXTENT THESE DOCUMENTS RELATE TO SUCH ISSUES, ELECTRICAL ROOF DEMOLITION POWER PLAN ARCHITECT'S PARTICIPATION IS SOLELY ADMINISTRATIVE WITHOUT ANY RESPONSIBILITY FOR THE . ALL TESTS TO CONFROM TO THE REQUIREMENTS OF SECTION 4-335, PART 1 TITLE 24. ELECTRICAL ROOF POWER PLAN CONTENT OR EXECUTION OF SUCH DOCUMENTS. ELECTRICAL DEMOLITION SIGNAL PLAN TESTS OF MATERIALS AND TESTING LABORATORY SHALL BE IN ACCORDANCE WITH SECTION 4-3350F 19. OF PARTICULAR IMPORTANCE IS THE NEED FOR CONTRACTOR TO ASSURE THAT ALL PERSONS PART 1, TITLE 24 AND THE DISTRICT SHALL EMPLOY AND PAY THE LABORATORY. COSTSOF RE-TEST ELECTRICAL SIGNAL PLAN ENTERING A POSSIBLY HAZARDOUS AREA, INCLUDING SUPERINTENDENTS, WORKERS, MAY BE BACK CHARGED TO THE CONTRACTOR. ELECTRICAL DEMOLITION FIRE ALARM PLAN SUBCONTRACTORS, OTHER CONTRACTORS, AND OTHER PERSONS NOT UNDER CONTRACTUAL ELECTRICAL FIRE ALARM PLAN CONTROL TO THE CONTRACTOR, ARE AWARE OF PROCEDURES. arphi DSA SHALL BE NOTIFIED AT THE START OF CONSTRUCTION AND PRIOR TO THE PLACEMENT OF This document is the property of the Owner and is not to be used without his written permission ELECTRICAL FIRE ALARM NOTES, DETAILS AND SCHEDULES CONCRETE PER SECTION 4-331, PART 1, TITLE 24. 20. ALL PIPE AND DUCT PENETRATIONS THROUGH FIRE RATED CONSTRUCTION SHALL BE FIRE STOPPED E6.02 ELECTRICAL FIRE ALARM RISER DIAGRAMS Architect/Engineer Of Record: W. LEE POLLARD AND SEALED TO MAINTAIN THE REQUIRED RATING. THIS PROJECT REQUIRES A DSA CERTIFIED PROJECT INSPECTOR. INSPECTOR SHALL BE APPROVED BY DSA. INSPECTION SHALL BE IN ACCORDANCE WITH SECTION 4-333(B). THE DUTY OF THE 21. DETAIL DRAWINGS WITH REFERENCES TO FIRE-RATED ASSEMBLIES OR CONSTRUCTION WHICH HAVE INSPECTOR SHALL BE IN ACCORDANCE WITH SECTION 4-342, PART 1, TITLE 24. BEEN TESTED BY UNDERWRITERS LABORATORIES, THE CALIFORNIA BUILDING CODE OR ANY OTHER APPROVED TESTING AGENCY, SHALL BE CONSTRUED TO INDICATE ALL CONSTRUCTION AND SUPERVISION OF CONSTRUCTION BY DSA SHALL BE IN ACCORDANCE WITH SECTION 4-334, PART 1, PROCEDURES CONTAINED IN THE REFERENCED ASSEMBLY FOR CONSTRUCTION. 2. CONTRACTOR TO MAINTAIN CONTEMPORANEOUSLY RECORDED "AS-BUILT" INFORMATION OF ALL CONTRACTOR, INSPECTOR, ARCHITECT, AND ENGINEERS SHALL SUBMIT VERIFIED REPORTS (FORM WORK, WHICH SHALL BE MARKED IN COLOR ON THE DRAWINGS AND SPECIFICATIONS. A SCANNED DSA-6 IN ACCORDANCE WITH SECTION 4-336 AND 4-343, PART 1, TITLE 24. PDF OF THE "AS-BUILT" DRAWINGS AND SPECIFICATIONS SHALL BE TURNED OVER TO THE OWNER'S REPRESENTATIVE PRIOR TO FINAL APPLICATION FOR PAYMENT. REFER TO SPECIFICATIONS FOR). THE ARCHITECT AND THE STRUCTURAL ENGINEER SHALL PERFORM THEIR DUTIES INACCORDANCE ADDITIONAL INFORMATION AND REQUIREMENTS. WITH SECTION 4-333(A) AND 4-341, PART 1, TITLE 24. HIBSER YAMAUCH 23. ALL ITEMS ARE NEW UNLESS OTHERWISE NOTED. 1. THE CONTRACTOR SHALL PERFORM HIS DUTIES IN ACCORDANCE WITH SECTION 4-343, PART 1, TITLE Architects, Inc Oakland, CA 94612 **DEFERRED APPROVALS SCOPE OF WORK** SUPPLEMENTAL NOTES 510.446.2222 tel | 510.446.2211 fax PROJECT LOCATION HY Architects Project number: SAN RAFAEL HIGH SCHOOL AD BUILDING, INTERIOR RENOVATION OF APPROX. 4,600 S.F. IN (E) SAN RAFAEL HIGH SCHOOL CONCRETE- AND WOOD-FRAMED BUILDING CONSTRUCTED IN 1924. ALL WORK ON MAIN FLOOR AND 150 3RD STREET, SAN RAFAEL, CA 94901 ROOF.ADMINISTRATIVE SPACE TO BE DEMOLISHED TO CREATE FIVE CLASSROOMS AND TWO BREAKOUT ROOMS. (N) WALLS, MECHANICAL EQUIPMENT, ELECTRICAL, LIGHTING, FINISHES. CASEWORK. NO PLUMBING. MINOR REPAIR OF FINISHES TO EXISTING 1.200 S.F. OF OFFICE SPACE STRUCTURAL SCOPE LIMITED TO REMOVING CONCRETE INFILL FROM TWO PREVIOUSLY INFILLED DOOR OPENINGS. INSTALLING BEAM TO SUPPORT OPERABLE PARTITION WALL, AND ANCHORING ROOF-MOUNTED MECHANICAL UNITS AD BUILDING REMODEL TITLE SHEET

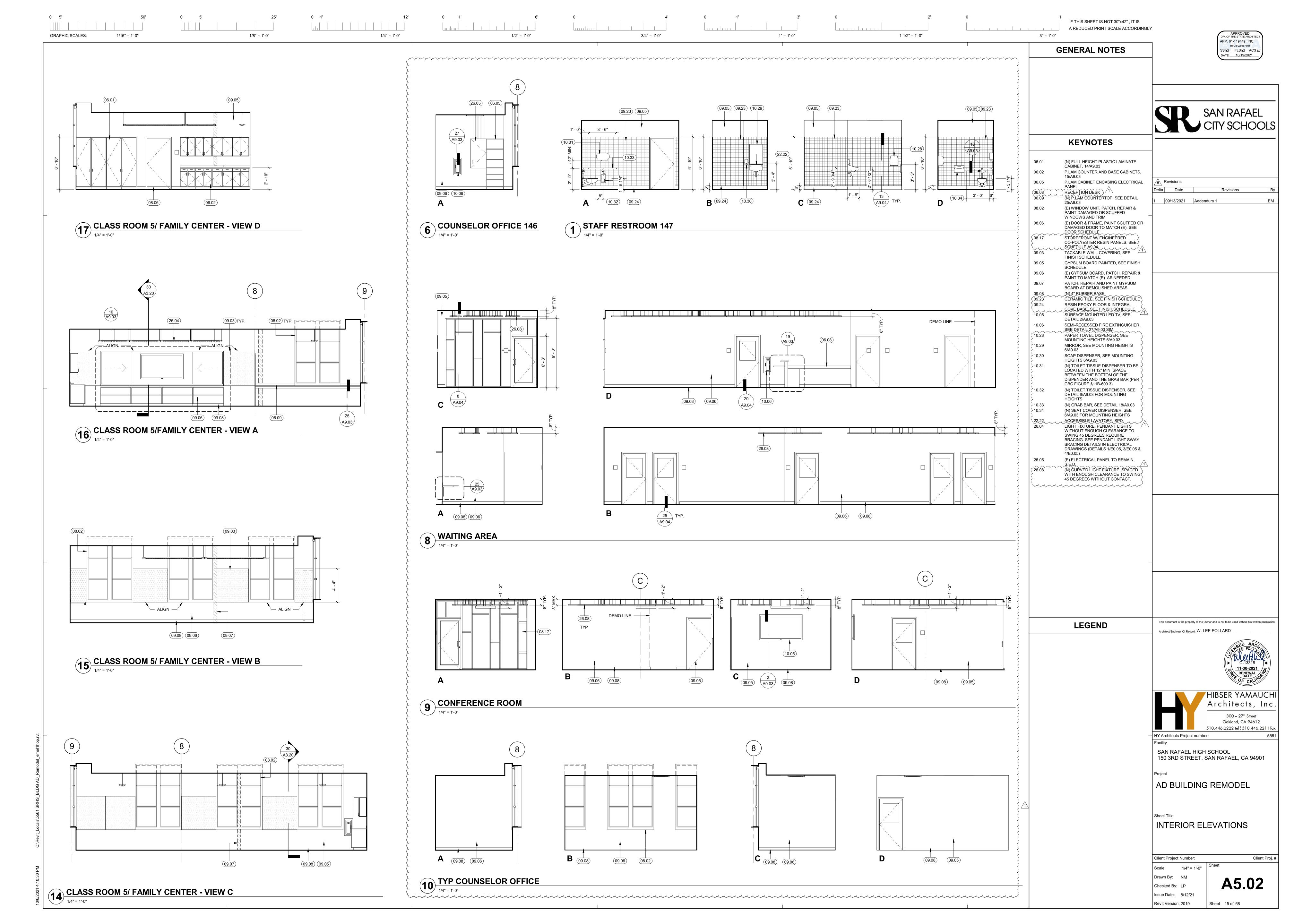


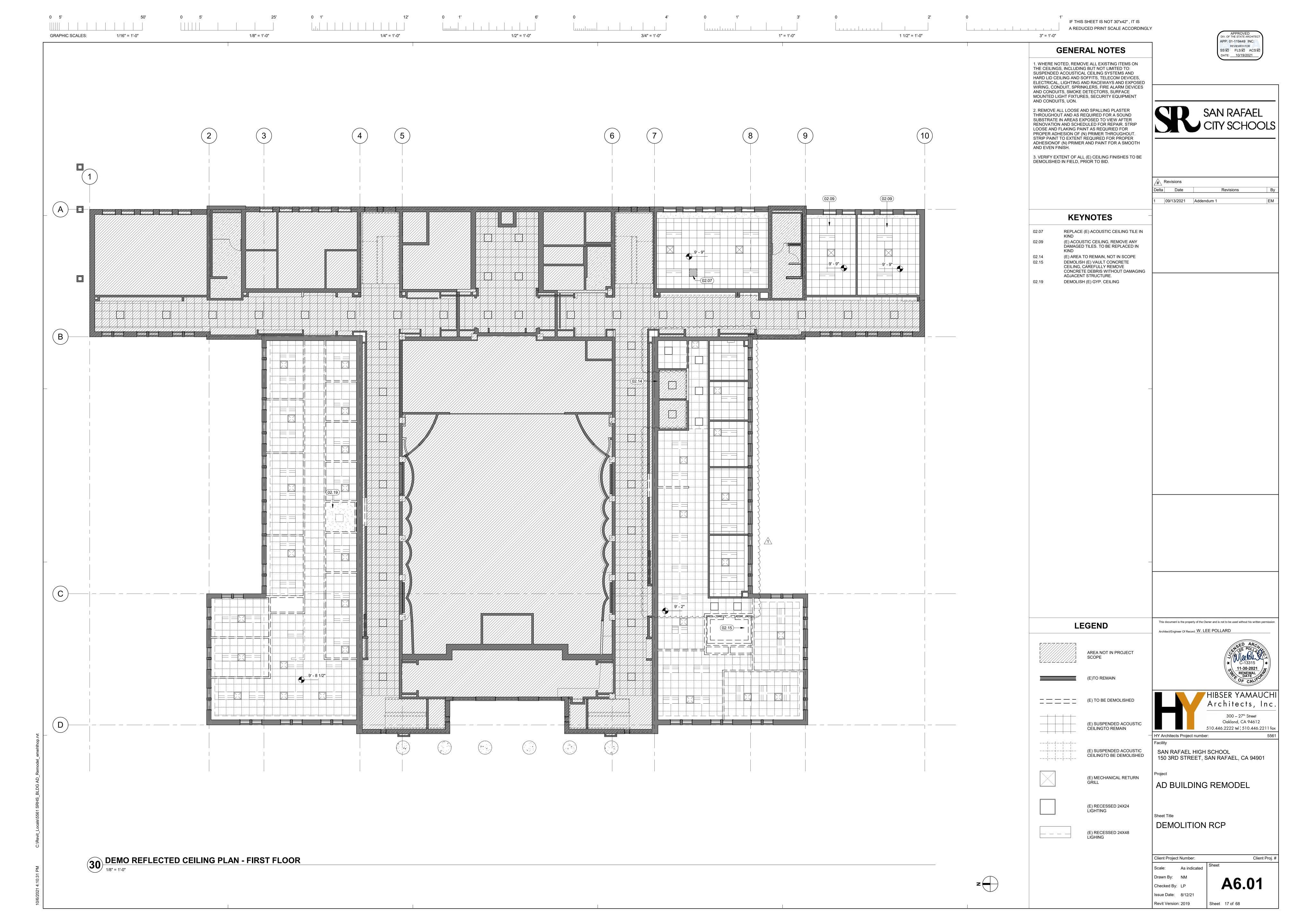


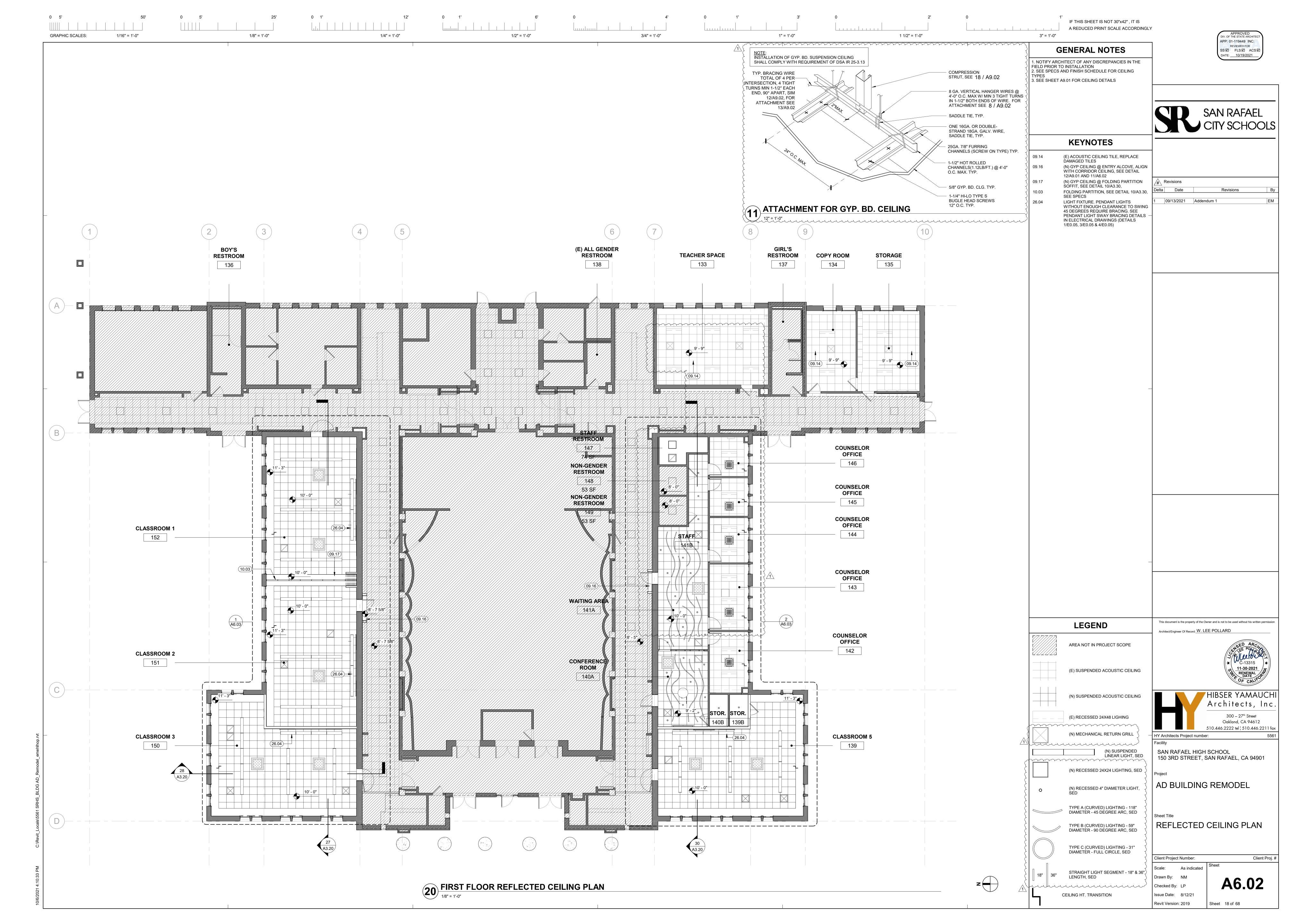


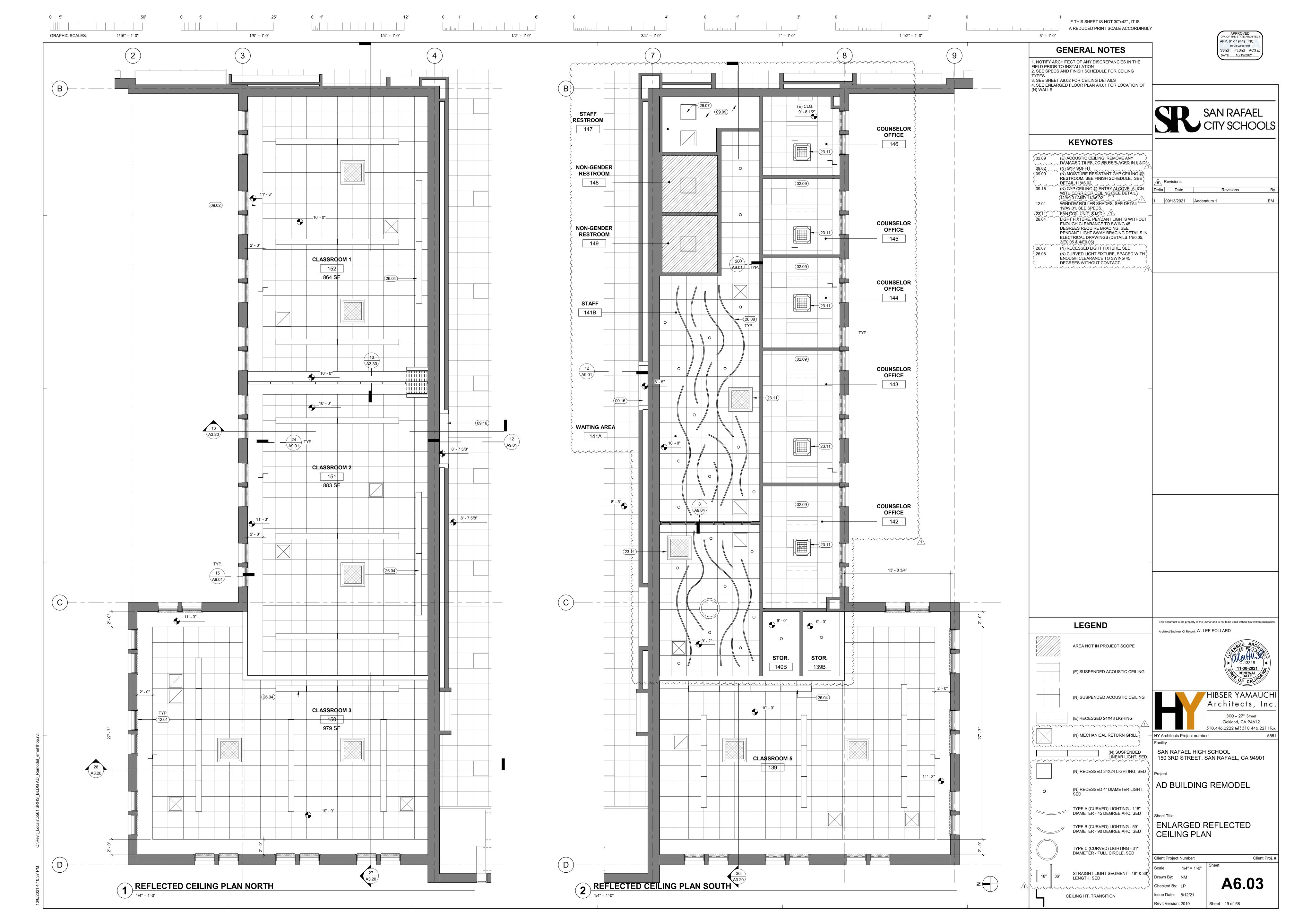


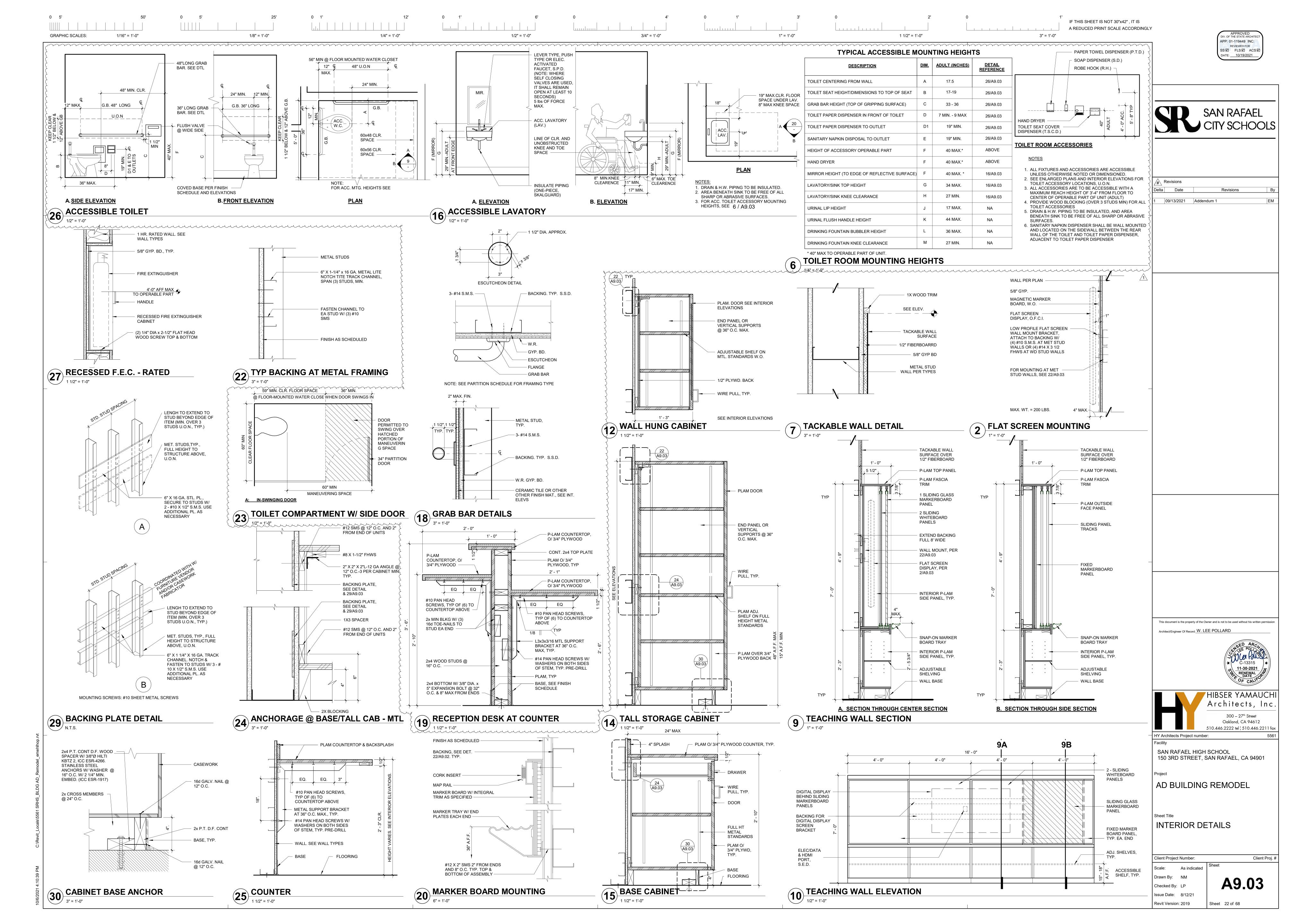


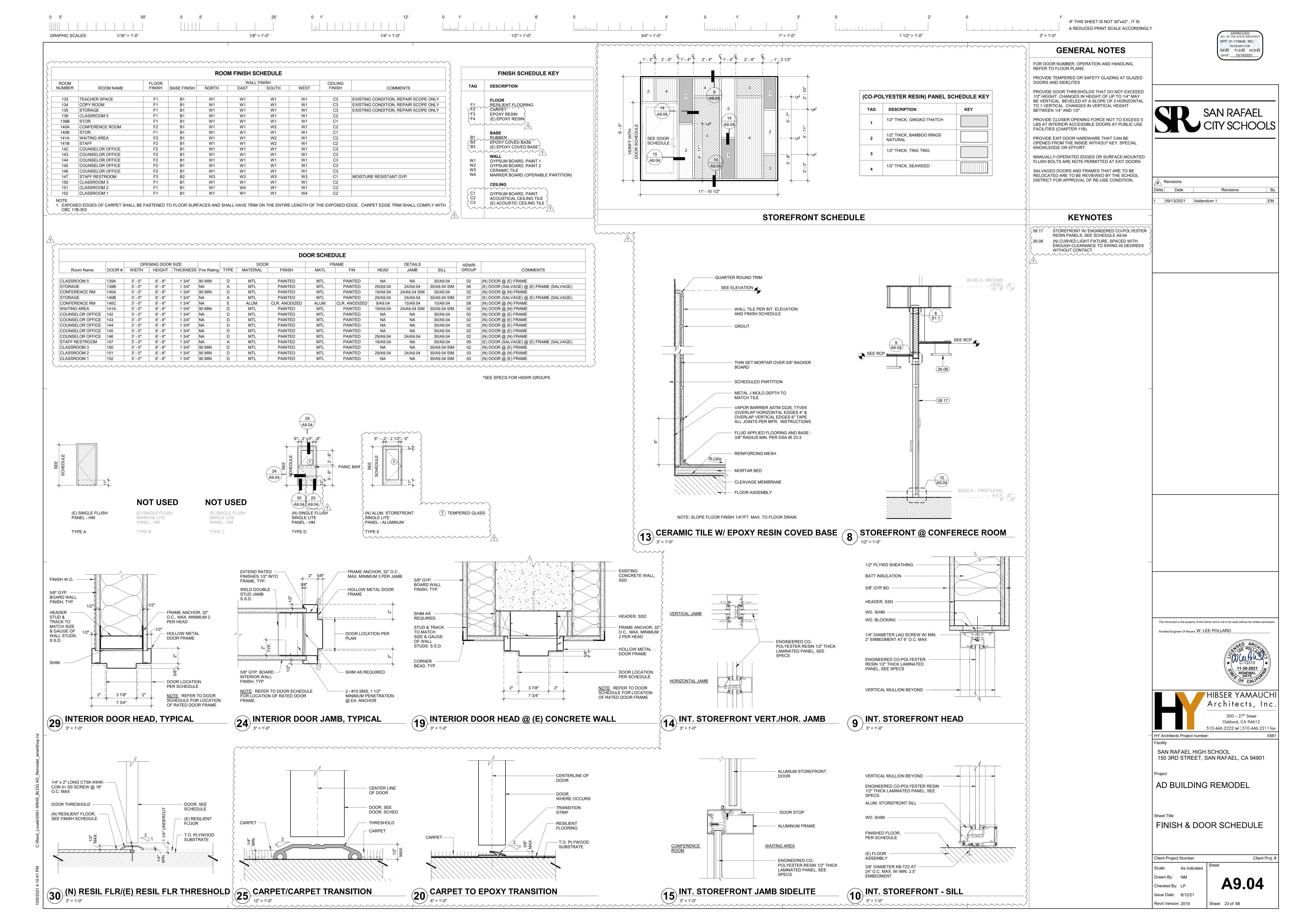














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HIBSER YAMAUCH Architects, Inc

IF THIS SHEET IS NOT 30"x42", IT IS A REDUCED PRINT SCALE ACCORDINGLY GRAPHIC SCALES: 1/8" = 1'-0" 1 1/2" = 1'-0" 3" = 1'-0"

BRANCH SELECTOR BOX SCHEDULE ELECTRICAL DATA "SAMSUNG" OPER. WT. MOUNTING NOTES LOCATION **HP UNIT** MODEL NO. (LBS.) MCA MOP SERVED VOLT/PH (INDOOR UNIT) BSB AD1 HRU AD1 3 M5.1 CLASSROOM MCU-S6NEK2N BSB AD2 HRU AD2 3 M5.1 BSB AD3 HRU AD2 COUNSELOR

REFER TO PIPING AND WIRING DWGS M6.3 AND M6.4 FOR REFRIGERANT PIPING SIZES.

						F	AN (COIL	U	NIT	SCHED	ULE				
UNIT	LOCATION	"SAMSUNG" MODEL NO. (INDOOR UNIT)	CFM	MIN. OA CFM	RATED COOLING CAPACITY (MBH)	RATED HEATING CAPACITY (MBH)	EL VOLT/PH	FAN MOTOR	DATA MCA	MOP (AMPS)	CONNECTED TO OUTDOOR	CONNECTED TO BRANCH	OPER. WT.	MOUNTING DETAIL	CONTROL DIAGRAM	NOTES
FC 139A	CLASSROOM 5 139	AM018NN4DCH/AA	550	N/A	18.0	20.0	208V/1Ph	1	0.70	15	HRU AD2	BSB AD2	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
FC 139B	CLASSROOM 5 139	AM018NN4DCH/AA	550	N/A	18.0	20.0	208V/1Ph	1	0.70	15	HRU AD2	BSB AD2	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
FC 140A	CONFERENCE ROOM 140A	AM006RN4DCH/AA	550	N/A	6.3	7.1	208V/1Ph	1	0.40	15	HRU AD2	BSB AD2	50	2 M5.1	2 M6.1	1, 2, 3, 4, 5
FC 141A	WAITING AREA 141A	AM006RN4DCH/AA	550	N/A	6.3	7.1	208V/1Ph	1	0.40	15	HRU AD2	BSB AD3	50	2 M5.1	2 M6.1	1, 2, 3, 4, 5
FC 142	COUNSELOR OFFICE 142	AM007NNNDCH/AA	320	60	7.5	8.7	208V/1Ph	1	0.24	15	HRU AD2	BSB AD2	35	2 M5.1	2 M6.1	1, 2, 4
FC 143	COUNSELOR OFFICE 143	AM007NNNDCH/AA	320	60	7.5	8.7	208V/1Ph	1	0.24	15	HRU AD2	BSB AD3	35	2 M5.1	2 M6.1	1, 2, 4
FC 144	COUNSELOR OFFICE 144	AM005NNNDCH/AA	300	45	5.0	6.0	208V/1Ph	1	0.24	15	HRU AD2	BSB AD3	35	2 M5.1	2 M6.1	1, 2, 4
FC 145	COUNSELOR OFFICE 145	AM005NNNDCH/AA	300	45	5.0	6.0	208V/1Ph	1	0.24	15	HRU AD2	BSB AD3	35	2 M5.1	2 M6.1	1, 2, 4
FC 146	COUNSELOR OFFICE 146	AM005NNNDCH/AA	300	45	5.0	6.0	208V/1Ph	1	0.24	15	HRU AD2	BSB AD3	35	2 M5.1	2 M6.1	1, 2, 4
FC 152A	CLASSROOM 1 152	AM018NN4DCH/AA	550	N/A	18.0	20.0	208V/1Ph	1	0.70	15	HRU AD1	BSB AD1	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
FC 152B	CLASSROOM 1 152	AM018NN4DCH/AA	550	N/A	18.0	20.0	208V/1Ph	1	0.70	15	HRU AD1	BSB AD1	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
FC 151A	CLASSROOM 2 151	AM018NN4DCH/AA	550	N/A	18.0	20.0	208V/1Ph	1	0.70	15	HRU AD1	BSB AD1	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
FC 151B	CLASSROOM 2 151	AM018NN4DCH/AA	550	N/A	18.0	20.0	208V/1Ph	1	0.70	15	HRU AD1	BSB AD1	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
FC 150A	CLASSROOM 3 150	AM018NN4DCH/AA	550	N/A	18.0	20.0	208V/1Ph	1	0.70	15	HRU AD1	BSB AD1	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
FC 150B	CLASSROOM 3 150	AM018NN4DCH/AA	550	N/A	18.0	20.0	208V/1Ph	1	0.70	15	HRU AD1	BSB AD1	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5

NOTES: 1. PROVIDE WITH HARD-WIRED WALL MOUNTED THERMOSTAT.

- 2. REFER TO MECHANICAL PIPING & WIRING DIAGRAMS DWGS M6.3 AND M6.4 FOR
- REFRIGERANT PIPING SIZES.
- 3. OUTSIDE AIR SUPPLY PROVIDED TO SPACE BY SEPARATE DOAS SYSTEM AS SHOWN ON PLANS.

	COIL	U	NIT	SCHED	ULE				
ELI	ECTRICAL	DATA							
н	FAN MOTOR	MCA	MOP (AMPS)	CONNECTED TO OUTDOOR	CONNECTED TO BRANCH	OPER. WT.	MOUNTING DETAIL	CONTROL DIAGRAM	NOTES
h	1	0.70	15	HRU AD2	BSB AD2	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
h	1	0.70	15	HRU AD2	BSB AD2	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
h	1	0.40	15	HRU AD2	BSB AD2	50	2 M5.1	2 M6.1	1, 2, 3, 4, 5
h	1	0.40	15	HRU AD2	BSB AD3	50	2 M5.1	2 M6.1	1, 2, 3, 4, 5
h	1	0.24	15	HRU AD2	BSB AD2	35	2 M5.1	2 M6.1	1, 2, 4
h	1	0.24	15	HRU AD2	BSB AD3	35	2 M5.1	2 M6.1	1, 2, 4
h	1	0.24	15	HRU AD2	BSB AD3	35	2 M5.1	2 M6.1	1, 2, 4
h	1	0.24	15	HRU AD2	BSB AD3	35	2 M5.1	2 M6.1	1, 2, 4
h	1	0.24	15	HRU AD2	BSB AD3	35	2 M5.1	2 M6.1	1, 2, 4
h	1	0.70	15	HRU AD1	BSB AD1	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
h	1	0.70	15	HRU AD1	BSB AD1	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
h	1	0.70	15	HRU AD1	BSB AD1	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
h	1	0.70	15	HRU AD1	BSB AD1	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
h	1	0.70	15	HRU AD1	BSB AD1	45	2 M5.1	2 M6.1	1, 2, 3, 4, 5
				HRII	RSR		2	(2)	

4. OPERATING WEIGHT INCLUDES ALL ACCESSORIES.

5. PROVIDE WITH MFR'S MERV-13 FILTER.

DEDICATED OUTSIDE AIR SYSTEM SCHEDULE SUPPLY FAN RELIEF FAN DX COIL MOUNTING CONTROL OPER. WT. LOCATION "DAIRTECH" COOLING HEATING ESP (IN. W.G.) TSP (IN. W.G.) ESP (IN. W.G.) **HEAT PUMP** "GREENHECK" DETAIL DIAGRAM "GREENHECK" SERVED MODEL CAP. EAT LAT CAP. EAT LAT (MBH) F DB F DB MODEL MODEL W.G.) DOAS CLASSROOMS 144-146 HP AD1 1 M6.2 SQ-160HP-VG CUSTOM 1.0 USF-13-B3 1390 1.0 4.9 | 4.9 | 15 1, 2, 3, 4, 5, 6 M5.2 CLASSROOM 139 & OFFICES CUSTOM SQ-160HP-VC 1090 1.75 1.0 USF-13-B3 1090 1.0 1.25 60.0 66.0 1100 1, 2, 3, 4, 5, 6

NOTES:

- 1. CONTRACTOR SHALL FIELD MEASURE EACH EXISTING ROOFTOP CURB AND SIZE/DIMENSION EACH CUSTOM
- DOAS UNIT TO FIT THE EXISTING CURB AND DUCT CONNECTIONS.
- 2. PROVIDE NEMA 3R DISCONNECT SWITCH FOR SINGLE POINT POWER CONNECTION. 3. PROVIDE (1) 24"X24"X2" MERV-13 FILTER WITH MAGNEHELIC GAUGE.

4. PROVIDE OUTSIDE AIR DAMPER WITH ACTUATOR AND RAIN HOOD.

5. PROVIDE ECM MOTORS WITH SPEED DIAL MOUNTED ON THE MOTORS.

6. PROVIDE INTEGRAL DRAIN PAN.

	DIFFUSER,	REGIST	ER & (GRILLE	SCHED	ULE
SYMBOL	DESCRIPTION	KRUEGER	METALAIRE	NAILOR	TITUS	TUTTLE & BAILEY
CD ×	MODULAR CORE SURFACE MOUNT CEILING DIFFUSER BEVEL FRAME 3/4" DROP	1240 FRAME 21 - 1-1/4"	9000–2	7500-S	MCD BORDER TYPE 6	SQD-SB
CDL	MODULAR CORE LAY-IN CEILING DIFFUSER FOR T-BAR CEILING 24x24 PANEL	1240 FRAME 23	9000-6P	7500-L	MCD BORDER TYPE 3	SQD-LT
CR/CT	CEILING RETURN/TRANSFER WITH 1/2" EGG CRATE CORE SURFACE MOUNT	EGC-5	CC5D	61 EC-S	MODEL 50 F BORDER TYPE 1	CRE500-SF
CRL/CEL	CEILING RETURN/EXHAUST WITH 1/2" EGG CRATE CORE IN 24x24 PANEL FOR T-BAR CEILING	EGC-5TB	CC5D-TBD	61 EC-L	MODEL 50 F BORDER TYPE 3	CRE500-LT
R/E *	RETURN/EXHAUST GRILLE WITH 35° OR 45° HORIZONTAL BARS.	S 80 H	SRH	7145 H	350 RL	T70D

- NOTES: 1. ALL SYMBOLS NOTED MAY NOT BE USED. REFER TO PLANS FOR SIZE AND QUANTITY.
 - 2. ALL SUPPLY AIR DIFFUSERS ARE 4 WAY BLOW
 - UNLESS SHOWN OTHERWISE.
 - 3. FURNISH ALL PRODUCTS OF A SINGLE MANUFACTURER.
 - ALUMINUM REGISTERS * FOR SHOWERS AND DAMP AREAS
- 4. COORDINATE DIFFUSER TYPE WITH REFLECTED CEILING PLAN.

GRILLES.

- 5. OPPOSED BLADE DAMPERS ARE NOT REQUIRED AT DIFFUSERS, REGISTERS OR
- 6. PROVIDE MANUAL AIR DAMPERS AT EACH BRANCH DUCT TO A SINGLE DIFFUSER, REGISTER OR GRILLE.

	HEAT PUMP UNIT SCHEDULE "SAMSUNG" PHYSICAL CO ELECTRICAL DATA HP CURB TOTAL													
		"SAMSUNG"	PHYSICAL	COOL	HEAT	ELEC	TRICAL D	ATA	HP	CURB	TOTAL	MOUNTING	CONTROL	
UNIT	LOCATION	MODEL NO.	DIMENSIONS HxWxD (in.)	(BTUH)	(BTUH)	VOLT/PH	MCA	МОСР	WT. (LBS.)	WT. (LBS.)	WT. (LBS.)	DETAIL	DIAGRAM	NOTES
HP AD1	ADMIN ROOF	AM060MXMDCHAA	56x37x13	60,000	66,000	208V/1ø	32	50	280	N/A	280	9 M5.2	3 M6.1	1, 2, 3, 4, 5
HP AD2	ADMIN ROOF	AM060MXMDCHAA	56x37x13	60,000	66,000	208V/1ø	32	50	280	N/A	280	9 M5.2	3 M6.1	1, 2, 3, 4, 5

NOTES:

- 1. R410 REFRIGERANT.
- 2. COOLING CAPACITY RATED AT 80°F DB / 67°F WB INDOOR AIR AND 95°F DB / 75°F OUTDOOR AIR.

4. REFER TO PIPING AND WIRING DIAGRAMS M6.3 AND M6.4 FOR REFRIGERANT PIPING SIZES. 5. REFER TO STRUCTURAL DRAWINGS FOR MOUNTING DETAILS

3. HEATING CAPACITY IS RATED AT 70°F DB / 60°F WB INDOOR AIR AND 47°F DB & 43°F WB OUTDOOR AIR.

	HEAT RECOVERY UNIT SCHEDULE													
UNIT	LOCATION	"SAMSUNG" MODEL	PHYSICAL DIMENSIONS	COOL	HEAT		TRICAL D		HRU WT.	CURB WT.	TOTAL WT.	MOUNTING DETAIL	CONTROL DIAGRAM	NOTES
		NO.	HxWxD (in.)	(BTUH)	(BTUH)	VOLT/PH	MCA	МОСР	(LBS.)	(LBS.)	(LBS.)	DETAIL	DIAGNAM	
HRU AD1	ADMIN ROOF	AM120FXVAFR2AA	67x51x31	114,000	129,000	208V/3ø	43.0	50	635	640	1,275	1 M5.1	<u>2</u> M6.1	1, 2, 3, 4
HRU AD2	ADMIN ROOF	AM96FXVAFR2AA	67x51x31	92,000	103,000	208V/3ø	37.8	50	635	640	1,275	1 M5.1	2 M6.1	1, 2, 3, 4

NOTES:

1. R410 REFRIGERANT.

- 2. COOLING CAPACITY RATED AT 80°F DB / 67°F WB INDOOR AIR AND 95°F DB / 75°F OUTDOOR AIR.
- 3. HEATING CAPACITY IS RATED AT 70°F DB / 60°F WB INDOOR AIR AND 47°F DB & 43°F WB OUTDOOR AIR. 4. REFER TO PIPING AND WIRING DIAGRAMS M6.3 AND M6.4 FOR REFRIGERANT PIPING SIZES.

Revisions

APPROVED
DIV. OF THE STATE ARCHITEC

APP: 01-119449 INC: REVIEWED FOR SS FLS ACS

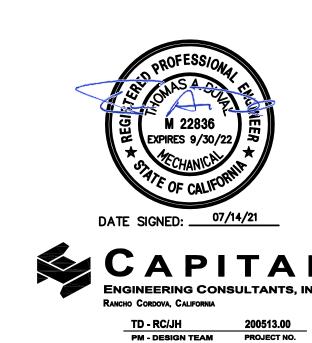
DATE: 10/19/2021

Delta	Date	Revisions	Ву
Λ	08/12/21	ADDENDUM 1	RC/J

DSA SUBMITTAL

ISSUE DATE: ISSUE DATE BY: INITIALS

AGENCY APPROVAL



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510.446.2222 tel | 510.446.2211 fa HY Architects Project number:

SAN RAFAEL HIGH SCHOOL 150 3RD STREET, SAN RAFAEL, CA 94901

AD BUILDING REMODEL

MECHANICAL SCHEDULES

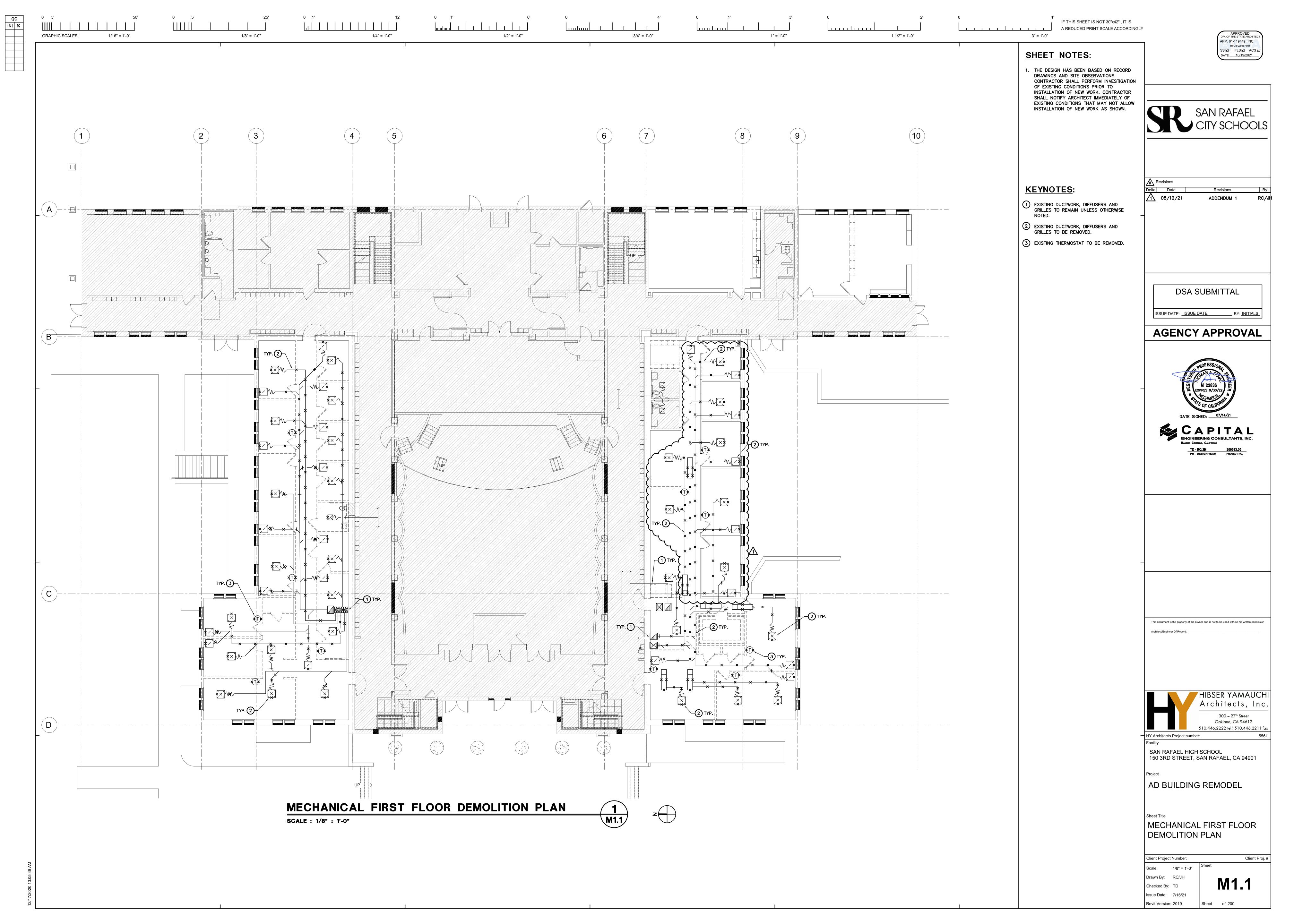
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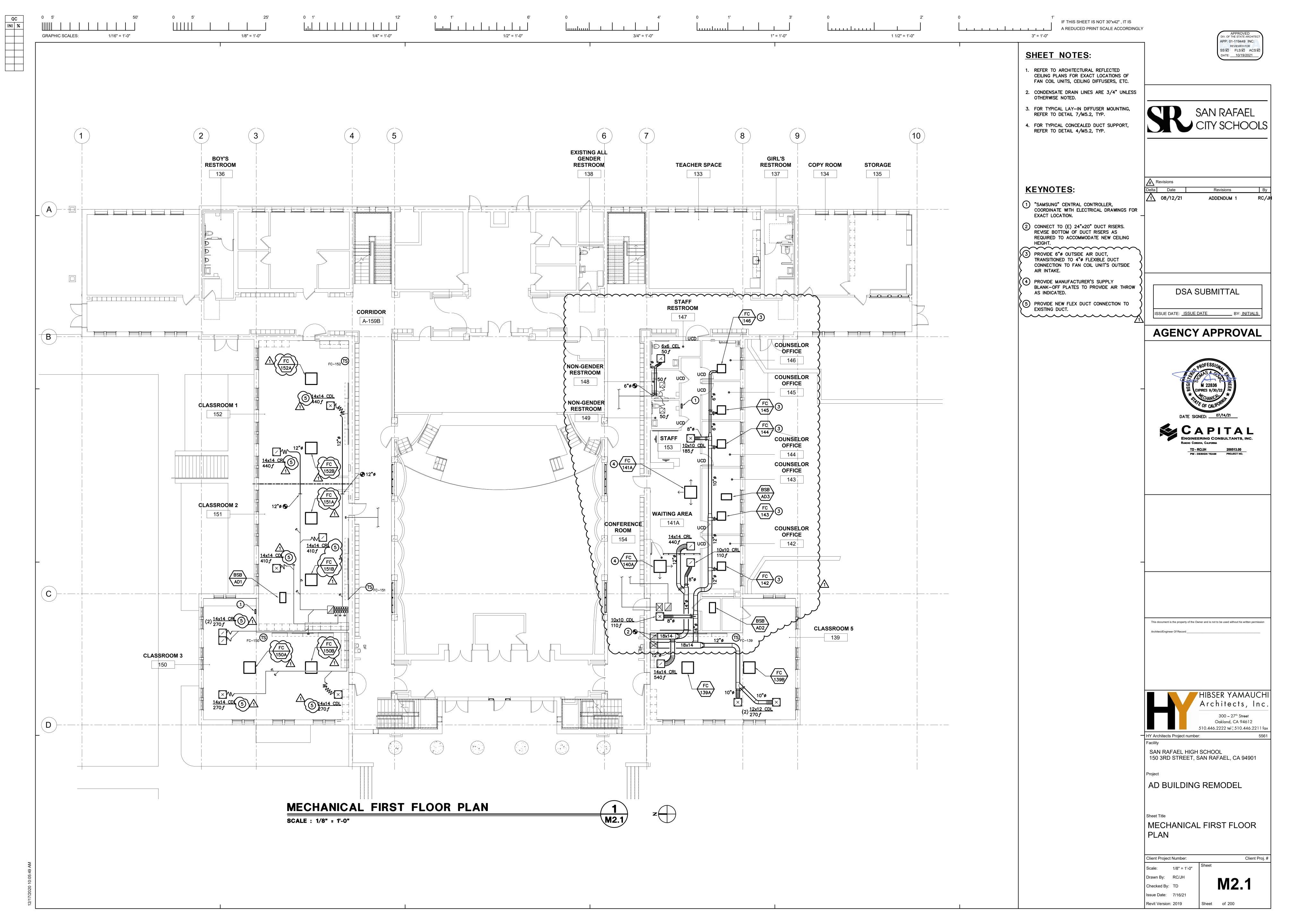
Client Project Number: Client Proj. #

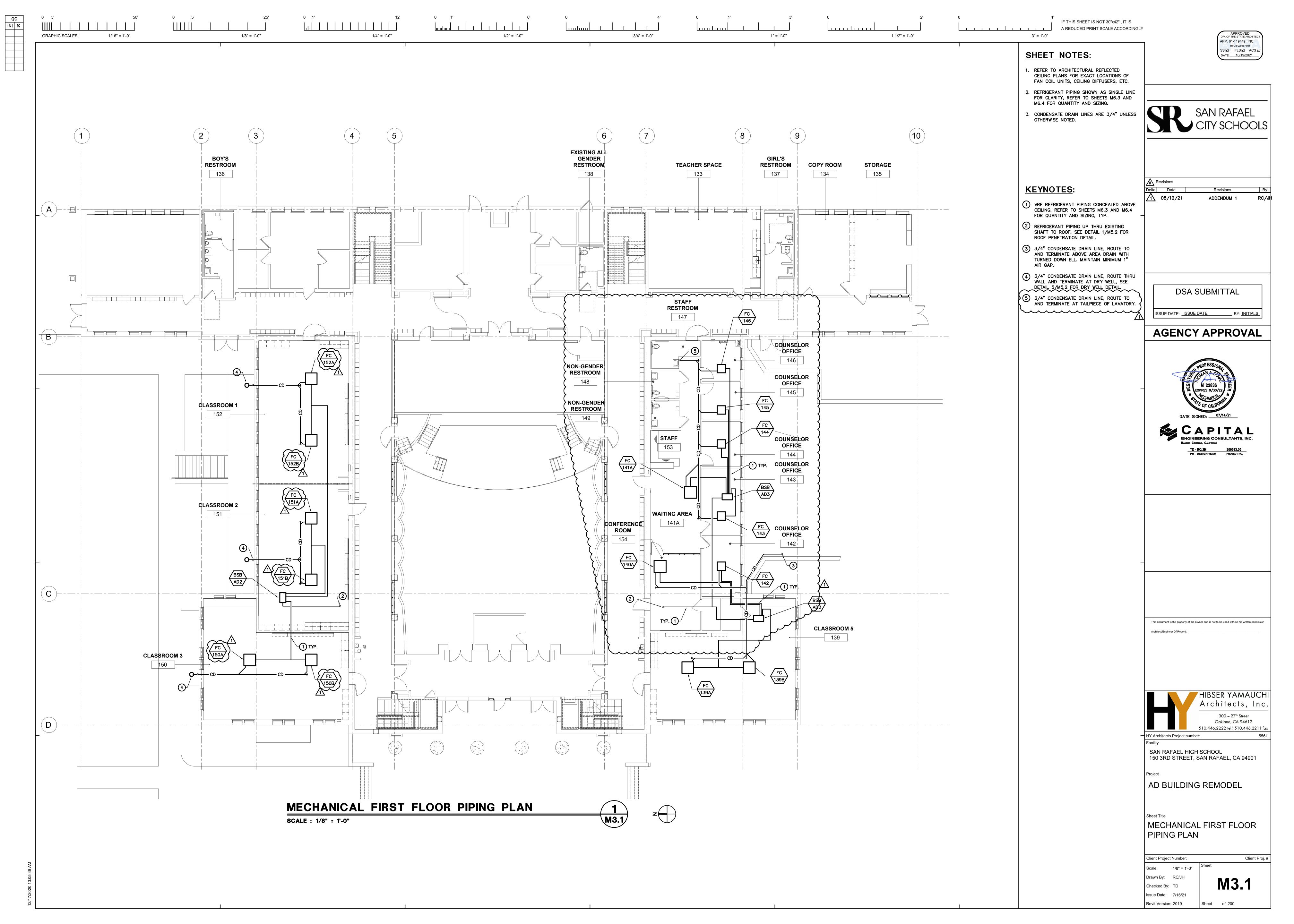
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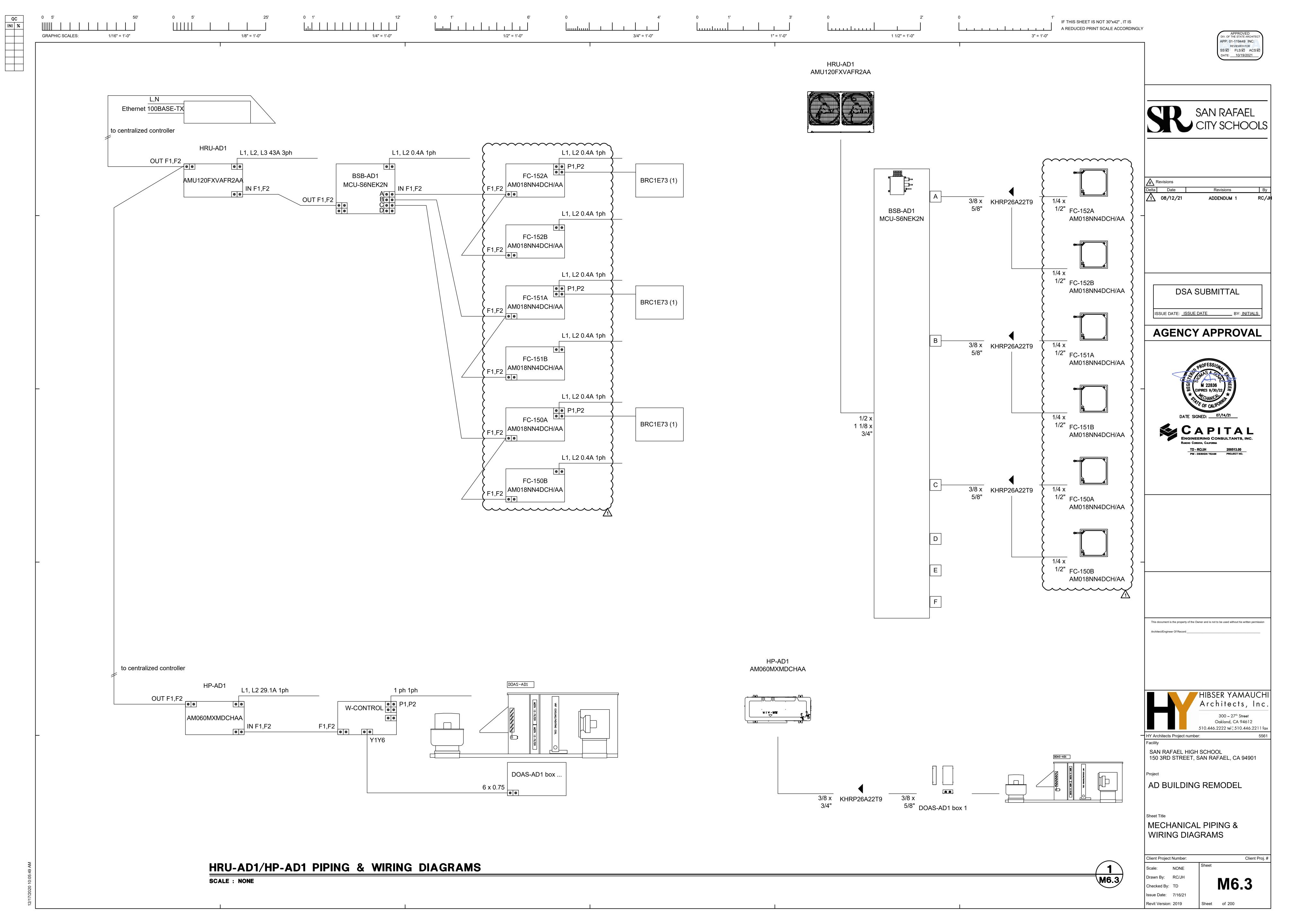
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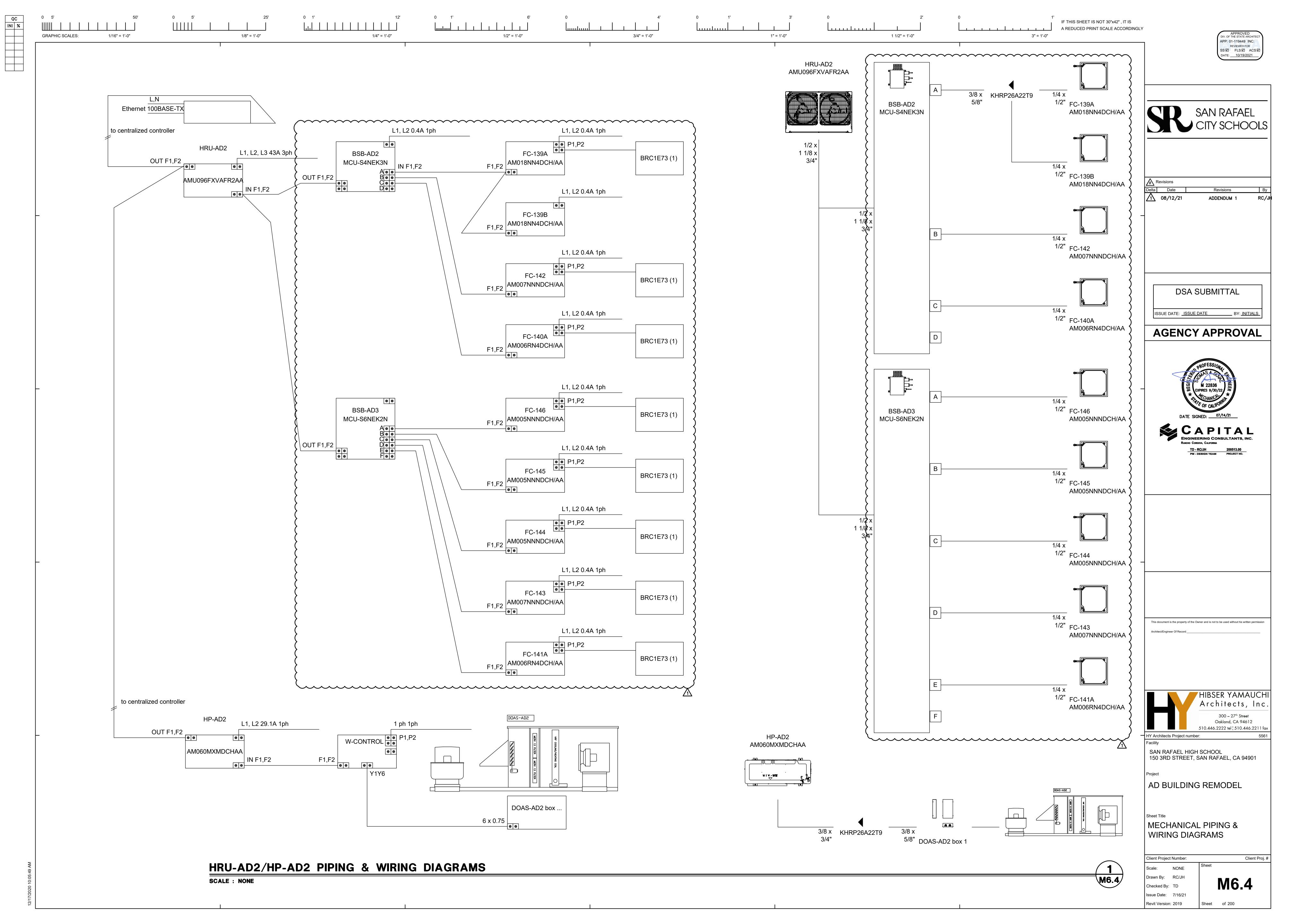
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IF THIS SHEET IS NOT 30"x42", IT IS A REDUCED PRINT SCALE ACCORDINGLY GRAPHIC SCALES: 1/16" = 1'-0" 1/8" = 1'-0" 1/4" = 1'-0" 1/2" = 1'-0" 3/4" = 1'-0" 1" = 1'-0" 1 1/2" = 1'-0" 3" = 1'-0" PLUMBING LEGEND PLUMBING LEGEND

PLUMBING GENERAL NOTES SEE ARCHITECTURAL DRAWINGS FOR BUILDING DIMENSIONS AND EXACT LOCATIONS OF PLUMBING FIXTURES. COORDINATE LOCATION OF PIPING WITH OTHER TRADES ON THIS PROJECT. 3. CONCEAL ALL PIPING IN WALL FURRING, PARTITIONS, ETC., EXCEPT AT MECHANICAL ROOMS. PROVIDE BALL VALVES ON WATER PIPE BRANCHES TO EQUIPMENT AND PLUMBING FIXTURES. PROVIDE ACCESS PANELS WHEN LOCATED IN FURRED SPACES OR ABOVE NON-REMOVABLE CEILINGS. ALL VALVES SHALL BE FULL LINE SIZE. 5. SEAL ALL PIPE PENETRATIONS THRU FLOORS WATERTIGHT. 6. PRIOR TO ANY SOLENOID VALVE, QUICK CLOSING VALVE, ETC. PROVIDE AND INSTALL SHOCK ABSORBER OF REQUIRED SIZE. PENETRATIONS OF RATED ASSEMBLIES SHALL BE FIRE-STOPPED. FIRE STOPPING SHALL BE AN APPROVED MATERIAL OF THE ENFORCING AGENCY. 8. OFFSET VENTS THRU ROOF 10 FEET MINIMUM FROM AIR INTAKES AND 4 FEET FROM OUTSIDE WALLS. 9. OFFSET ALL RISERS AND DROPS TO AVOID PENETRATIONS AT TOP PLATES. 10. FIELD VERIFY EXACT SIZES, LOCATIONS AND ELEVATIONS OF ALL PIPING CONNECTIONS, OTHER WORK, ETC., PRIOR TO TRENCHING OR INSTALLING OF ANY NEW WORK.

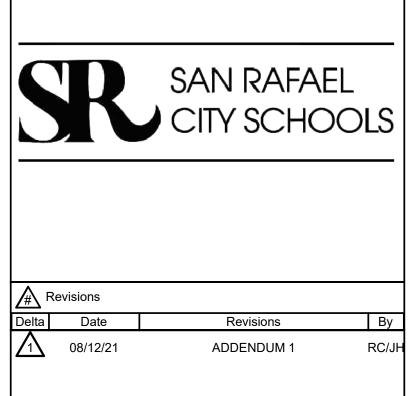
-			011
<u>.</u> .	COORDINATE LOCATION OF PIPING WITH OTHER TRADES ON THIS PROJECT.	OFL	OH OFL
3.	CONCEAL ALL PIPING IN WALL FURRING, PARTITIONS, ETC., EXCEPT AT MECHANICAL ROOMS.		OD
ļ.	PROVIDE BALL VALVES ON WATER PIPE BRANCHES TO EQUIPMENT AND PLUMBING FIXTURES. PROVIDE ACCESS PANELS WHEN LOCATED IN FURRED SPACES OR ABOVE NON-REMOVABLE CEILINGS. ALL VALVES SHALL BE FULL LINE SIZE.		AN
5.	SEAL ALL PIPE PENETRATIONS THRU FLOORS WATERTIGHT.		PT
6.	PRIOR TO ANY SOLENOID VALVE, QUICK CLOSING VALVE, ETC. PROVIDE AND INSTALL SHOCK ABSORBER OF REQUIRED SIZE.		POC PG P & TRV
' .	PENETRATIONS OF RATED ASSEMBLIES SHALL BE FIRE-STOPPED. FIRE STOPPING SHALL BE AN APPROVED MATERIAL OF THE ENFORCING AGENCY.	——PD——	PRV PD
3.	OFFSET VENTS THRU ROOF 10 FEET MINIMUM FROM AIR INTAKES AND 4 FEET FROM OUTSIDE WALLS.		RWL
).	OFFSET ALL RISERS AND DROPS TO AVOID PENETRATIONS AT TOP PLATES.	<u></u>	WH RV or P&TRV
0.	FIELD VERIFY EXACT SIZES, LOCATIONS AND ELEVATIONS OF ALL PIPING CONNECTIONS, OTHER WORK, ETC., PRIOR TO TRENCHING OR INSTALLING OF ANY NEW WORK.	· ·	DET
	OTHER WORK, ETC., I KIOK TO TRENOTING OR INGTALLING OF ANTINEW WORK.		RET RE , IE
			(R) , (D)
	MEP COMPONENT ANCHORAGE NOTE		
	ALL MEGUANIGAL PLUMPING AND ELECTRICAL COMPONENTS CHALL DE ANGUIGNES AND MICTAL ED DED	 _	R , D RD
	ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. THE FOLLOWING COMPONENTS SHALL RE ANGLIOPED OF REACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIPED IN THE	——₩——	
	BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2019 CBC, SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTER 13, 26 AND 30.	———SD———	SD S or SK
	1. ALL PERMANENT EQUIPMENT AND COMPONENTS.	——————————————————————————————————————	STR
	2. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR		TA TB
	110/220 VOLT RECEPTIACLES HAVING FLEXIBLE CABLE. 3. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 POUNDS OR HAS A		T TH
	CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT ARE REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.	<u> </u>	TP
	THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE	———ТР———	TYP
	STRUCTURE, BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED.ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BEWEEN THE COMPONENT AND	——II———	UN
	ASSOCIATED DUCTWORK, PIPING, AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS.		UG
	A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4	, å	UR
	FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.	——⊗——	VB
	B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTION SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG		V
	FROM A WALL.	V , VR , VTR	V
	THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL AND PLUMBING COMPONENETS SHALL BE SUBJECT TO THE	├	WCO
	APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL		WC
	COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH THE ABOVE REQUIREMENTS.		WH
			W WHA
		† <u>*</u> †	VVIIA
			WSFU

W RAINWATER LEADER W DRAIN HOR HE HEEVE WN IN DIRECTION OF FLOW TEE CONNECTION, NEW TO EXISTING HE GAUGE HE & TEMPERATURE RELIEF VALVE FOR HEADER DIBOX HOSE BIBB OR WALL HYDRAIN HALVE OR PRESSURE HATURE RELIEF VALVE HATION, INVERT ELEVATION DP WN (ELBOW) HOP HIN DIVIDION OF THE HEADER HEADER HEADER HEADER HEADER HOR OF HOR HEADER	LVE PIPING DRANT		PCD CO F -, - X X	AFO AF , AD , BV CO CK' CW(CW(CU(DL DF PCI
W DRAIN HOR JE JEEVE WN IN DIRECTION OF FLOW TEE CONNECTION, NEW TO EXISTING E GAUGE E & TEMPERATURE RELIEF VALVE E REDUCING VALVE CHARGE LINE ER LEADER D BOX HOSE BIBB OR WALL HYDRA ALVE OR PRESSURE EATURE RELIEF VALVE ATION, INVERT ELEVATION DP WN (ELBOW) JEROP AIN D VALVE WITH MOTOR ACTUATOR RAIN C OR ROOF) ABOVE D WATER SUPPLY JETER MER MER MER PIPING	LVE PIPING DRANT		PCD	AF,I AD,, BV COI CKV CW(I CW(I CD DL DN DFI PCI
HOR IE EEVE WN IN DIRECTION OF FLOW TEE CONNECTION, NEW TO EXISTING E GAUGE E & TEMPERATURE RELIEF VALVE FOR THE PROPERTY OF	LVE PIPING DRANT		PCD	AD ,
EEVE WN IN DIRECTION OF FLOW TEE CONNECTION, NEW TO EXISTING E GAUGE E & TEMPERATURE RELIEF VALVE F E REDUCING VALVE CHARGE LINE ER LEADER D BOX HOSE BIBB OR WALL HYDRA ALVE OR PRESSURE FATURE RELIEF VALVE ATION , INVERT ELEVATION DP WN (ELBOW) (ELBOW) (PROPAIN D VALVE WITH MOTOR ACTUATOR RAIN COR ROOF) ABOVE COR UG) BELOW D WATER SUPPLY METER MER MER PIPING	LVE PIPING DRANT		PCD	COF CK\ CW(F CW(F CD DL DN DF(F PCE
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AIN O VALVE WITH MOTOR ACTUATOR RAIN OR ROOF) ABOVE OR UG) BELOW D WATER SUPPLY METER MER MER PIPING	OR		-,- -x x x	
O VALVE WITH MOTOR ACTUATOR RAIN C. OR ROOF) ABOVE COR UG) BELOW D WATER SUPPLY METER MER MER PIPING	OR		-x - x - x -	
RAIN COR ROOF) ABOVE COR UG) BELOW D WATER SUPPLY METER MER MER PIPING	ΣR		•	(E)
OR ROOF) ABOVE OR UG) BELOW D WATER SUPPLY IETER MER MER PIPING		1 1		EJ
OR ROOF) ABOVE OR UG) BELOW D WATER SUPPLY METER MER MER PIPING				EWH
OR ROOF) ABOVE OR UG) BELOW D WATER SUPPLY METER MER MER PIPING				FA
OR UG) BELOW D WATER SUPPLY IETER MER MER PIPING				FB
D WATER SUPPLY IETER MER MER PIPING			FF=	
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MER PIPING			Ø Ioool	FCC
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FLANGE				10
OUND				FLV
COND			FV , FT	ILV
RISER (TYPE AS INDICATED OR NO	NOTED)		(FA) , (TA)	
VALVE BOX (VALVE TYPE SYMBOL A	•		(FA) , (TA) (FB) , (TB)	
·	,OE / (O		<u> </u>	GSCK ,
·				GSCR,
			(R)	GPF
				GM
				GV
			□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	GPN
				OI IV
TE OR SANITARY SEWER				
TE OR SANITARY SEWER				GLV
TE OR SANITARY SEWER	OR ANGLE STOP		—————————————————————————————————————	GLV GCC GW
	FOR VALVE TYPE USED) NG NT RISER , VENT THRU ROOF	NG		RANT ————————————————————————————————————

SYMBOL	ABBREVIATION	DESCRIPTION
	ABC	ABOVE CEILING
	AFF	ABOVE FINISHED FLOOR
1	AFG	ABOVE FINISHED GRADE
	AF , BF	ABOVE FLOOR , BELOW FLOOR
	AD , AP	ACCESS DOOR , ACCESS PANEL
	BV	BALL VALVE
		BRANCH - TOP CONNECTION
		BRANCH - BOTTOM CONNECTION
or		BRANCH - SIDE CONNECTION
	COP	CAP ON END OF PIPE
	301	
	CKV	CENTER LINE CHECK VALVE
	CW	COLD WATER DISE
	CW(R)	COLD WATER RISE
	CW(D)	COLD WATER DROP
——CD ——	CD	CONDENSATE DRAIN LINE
	DL	DEVELOPED LENGTH
	DN	DOWN
	DFU	DRAIN FIXTURE UNIT
PCD—	PCD	PUMPED CONDENSATE DRAIN
	CO	CLEANOUT
		DEGREES FAHRENHEIT
-,—	<u></u> ,	DIAMETER, SQUARE (FEET)
* * *	(E)	EXISTING TO BE REMOVED
	EJ	EXPANSION JOINT
	EWH	ELECTRIC WATER HEATER
	FA	FROM (LEVEL OR ROOF) ABOVE
	FB	FROM (LEVEL OR UG) BELOW
FF=		FINISHED FLOOR ELEVATION
FU		FIXTURE UNIT
	FC	FLEXIBLE CONNECTOR
Ø	FCO	FLOOR CLEANOUT
Ø——	FD	FLOOR DRAIN
	FS	FLOOR SINK
		FLOW IN DIRECTION OF ARROW
─────	FLV	FLOW LIMITING VALVE
FV , FT		FLUSH VALVE , FLUSH TANK
(FA) , (TA)		FROM ABOVE , TO ABOVE
(FB) , (TB)		FROM BELOW , TO BELOW
─ ──────────────	GSCK , PC	GAS COCK , PLUG COCK
	G	GAS - LOW PRESSURE
R	GPR	GAS PRESSURE REGULATOR
	GM	GAS METER
<u>.</u>		GAS SEISMIC VALVE
	GV	GATE VALVE
	GPM	GALLONS PER MINUTE
	GLV	GLOBE VALVE
Ø	GCO	GRADE CLEANOUT, EXTERIOR
—— GW ——	GW	GREASE WASTE PIPING
	HD	HOPPER DRAIN , HUB DRAIN
	НВ	HOSE BIBB
	HW	HOT WATER PIPING
 	HW	HOT WATER PIPING WITH HEAT TRACE TAPE
	HWR	HOT WATER RETURN
()	() HW	HOT WATER (TEMP. ~F)
()	()HWR	HOT WATER RETURN (TEMP. ~F)
	HWSFU	HOT WATER RETURN (TEMP. ~F)
	D	INDIRECT DRAIN , CONDENSATE DRAIN
	IE or INV	INVERT ELEVATION
	L	LAVATORY SINK
	LL	LONGEST LENGTH (GAS)
——MG——	MG	MEDIUM PRESSURE GAS
	(N) , (E)	NEW, EXISTING
	(NTS)	NOT TO SCALE

DESCRIPTION





DSA SUBMITTAL	

AGENCY APPROVAL

ISSUE DATE: ISSUE DATE BY: INITIALS



*o	ECHANICA STORY	<i>, </i> ★
DATE S	OF CALIFO	7/14/21
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	EERING COI DRDOVA, CALIFORNIA	NSULTANTS, INC.
TD	- RC/JH	200513.00
PM	- DESIGN TEAM	PROJECT NO.

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Architect/Engineer Of Record:_

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510.446.2222 tel ; 510.446.2211 fa HY Architects Project number:

SAN RAFAEL HIGH SCHOOL 150 3RD STREET, SAN RAFAEL, CA 94901

AD BUILDING REMODEL

PLUMBING LEGENDS, SCHEDULES, NOTES, AND FIXTURE SCHEDULE

Client Project Number:

	PLUMBING FIXTURE SPECIFICATION & CONNECTION SCHEDULE														
ADA	SYMBOL	FIXTURE	FIXTURE	FAUCET OR VALVE	TRIM	REMARKS	VENT	WA	STE	COLD	COLD WATER		WATER		
			MANUFACTURER AND MODEL No.	MANUFACTURER AND MODEL No.	MANUFACTURER AND MODEL No.			BRANCH	OUTLET	BRANCH	OUTLET	BRANCH	OUTLE		
	WC-1	WATER CLOSET WALL MOUNTED FLUSH VALVE STD/ACCESSIBLE	"KOHLER" KINGSTON 1.28, NO. K4325, WALL HUNG, VITREOUS CHINA, ELONGATED, SIPHON JET ACTION, 1-1/2" TOP SPUD. 1.28 GPF	"SLOAN" ROYAL 111 HET 1.28, ADA COMPLIANT, 1.28 GPF (MANUAL)	SEAT: "CHURCH" MODEL 295SSCT OR "BEMIS" MODEL 1955SSCT. PROVIDE WITH SELF- SUSTAINING CONCEALED CHECK HINGES, ONE PIECE STAINLESS STEEL POST HINGES, WHITE COLOR. CARRIER: "JAY R. SMITH" 100 OR 200 SERIES OR 500# RATED "ZURN" Z1201 AND Z1202 SERIES PROVIDE REAR SUPPORT LUG AND ANCHOR FOOT ASSEMBLY.	MOUNT AT HEIGHT INDICATED ON ARCHITECTURAL DRAWINGS. WHERE USED FOR CBC ACCESSIBLE WATER CLOSETS, THE FLUSH VALVE HANDLE SHALL BE MOUNTED ON THE WIDE SIDE OF THE WATER CLOSET ENCLOSURE.	2"	4"	4"	1-1/4"	1"				
	L-1	LAVATORY WALL MOUNTED HOT AND COLD WATER STD/ACCESSIBLE	"KOHLER" KINGSTON NO. K-2005 WALL HUNG, VITREOUS CHINA WITH CONTOURED BACK AND SIDE SPLASH SHIELDS, FRONT OVERFLOW, CONCEALED ARM RECESS, 4" CENTERS, 21-1/4" x 18-1/8" D SHAPED BOWL.	"CHICAGO" 3600-E2805AB FAUCET, PUSH LEVER WITH AERATOR WITH 0.5 GPM FLOW RATE. WITH VANDAL RESISTANT ECONO-FLO SPRAY OUTLET. WITH IPS CONNECTIONS, ADA COMPLIANT.	ADA COMPLIANT. LAVATORY GRID DRAIN WITH 1-1/4" OFFSET TAILPIECE, INTEGRAL PERFORATED GRID NO. 7723.018, CHROME FINISH. MOUNT P-TRAP FLUSH TO WALL. CARRIER: "JAY R. SMITH" 0700 OR ZURN Z1231	MOUNT AT HEIGHT INDICATED ON ARCHITECTURAL DRAWINGS. PROVIDE CONCEALED ARMS AND FLOOR SUPPORT, WITH FEET OF SUPPORT SECURELY ANCHORED TO FLOOR. IN ADDITION ANCHOR	1-1/2"	2"	1-1/2"	3/4"	1/2"	3/4"	1/2"		

DISTRIBUTION SYSTEM BRACING NOTE

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. WHEN BRACING AND ATTACHMENTS ARE BASED ON PREAPPROVED INSTALLATION

GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF AND DURING THE HANGING AND BRACING OF THE DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY

AND DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTION 13.6.5,

GUIDE (e.g., OSHPD OPM FOR 2013 CBC OR LATER). COPIES OF THE BRACING SYSTEM INSTALLATION

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION

MP□ MD□ PP□ E□ OPTION 1: DETAILED ON THE APPROVED DRAWINGS WITH PROJECT SPECIFIC NOTES

MP□ MD□ PP E□ OPTION 2: SHALL COMPLY WITH THE APPLICABLE OSHPD PRE-APPROVED (OPM #)

13.6.6, 13.6.7, 13.6.8, AND 2019 CBC, SECTIONS 1617A.1.24, 1617A.1.25, AND 1617A.1.26.

OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

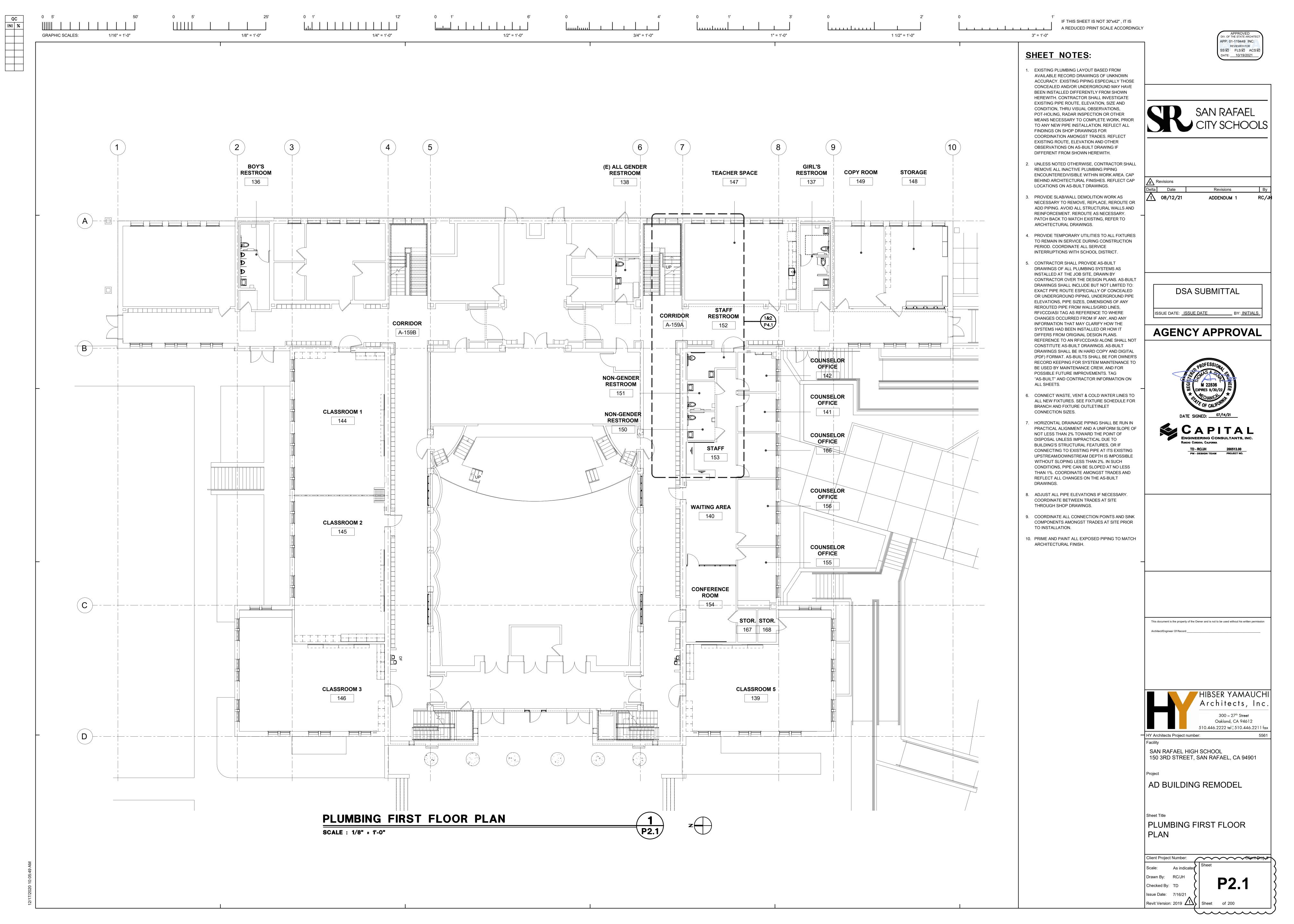
AND DETAILS

SYSTEMS (E):

QC INI %

Checked By: TD Issue Date: 7/16/21

Revit Version: 2019 1 Sheet of 200



QC INI % 1/8" = 1'-0"

0 1'

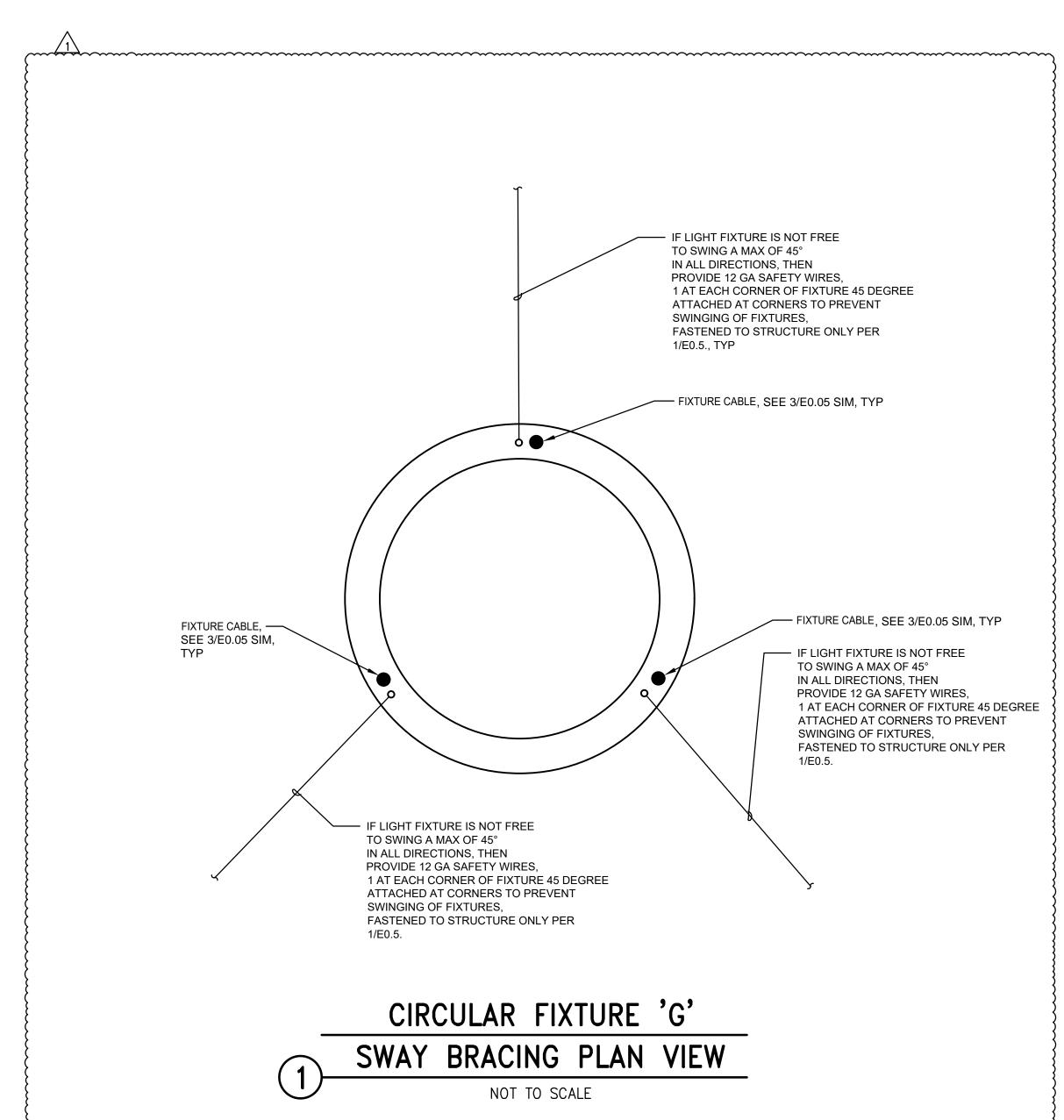
1/4" = 1'-0"

	-
NOTE: ALL EXTERIOR CABLE SHALL BE WET RATED.	

GRAPHIC SCALES:

1/16" = 1'-0"

			FIXTUE	RE SCHEDULE		
TYPE	MANUFACTURER AND CATALOG NUMBER	LAMP QUANTITY AND TYPE	WATTAGE AND VOLTAGE	DESCRIPTION	WEIGHT	MOUNTING DETAIL
Α	FINELITE #S12 LED ID-DCO-4'-3E-S-H-830-OPEN- 277-DC-FA-FE	LED	37 WATTS 277 V	SUSPENDED LINEAR FIXTURE	16 LBS	3/E0.05
AE	FINELITE #S12 LED ID-DCO-4'-3E-S-H-830-OPEN- 277-DC-FA-FE-EM	LED	37 WATTS 277 V	SAME AS TYPE AEXCEPT WITH EMERGENCY BATTERY PACK	16 LBS	3/E0.05
	FINELITE # HP4P-WWD-x-x-835	LED	37 WATTS 277 V	SUSPENDED LINEAR WHITEBOARD WALLWASH FIXTURE	16 LBS	3/E0.05
С	FINELITE #HPR LED-A-2X2-DCO-S-835-EM	LED	20 WATTS 277 V	SURFACE 2X2 LED FIXTURE IN RESTROOMS	20 LBS	2/E0.05
CE	FINELITE #HPR LED-A-2X2-DCO-S-835-EM	LED	20 WATTS 277 V	SAME AS TYPE C EXCEPT WITH EMERGENCY BATTERY PACK	20 LBS	2/E0.05
D	WILLIAMS #4PR-TL-L20-835-DIM-UNV-L-M-OF-CS-N	LED	20 WATTS 277 V	RECESSED 4.5" DIAMETER DOWNLIGHT WITH FLUSH LENS, MEDIUM DISTRIBUTION, CLEAR SEMI-SPECULAR REFLECTOR	20 LBS	2/E0.05
DE	WILLIAMS #4PR-TL-L20-835-EM/10W-DIM-UNV-L-M- OF-CS-N	LED	20 WATTS 277 V	SAME AS TYPE D EXCEPT WITH EMERGENCY BATTERY PACK	20 LBS	2/E0.05
F	VONN LIGHTING #4PR-TL-L20-835-DIM-UNV-L-M-OF-CS-N	LED	3 WATTS/LF 277 V	SUSPENDED WAVY LINEAR DIRECT DOWNLIGHT FIXTURES WITH SILVER FINISH AND 382 LUMENS/FT. COMPLETE INSTALLATION DRAWINGS TO BE PROVIDED BY MANUFACTURER. SEE 5/E0.04 FOR ADDITIONAL INFORMATION. NOTE: SWAY BRACING FOR THIS FIXTURE SHALL BE PER 3/E0.05 AND FIXTURE SEGMENTS SHALL BE A MAXIMUM OF 8'-0" LONG.	2 LBS PER LF	3/E0.05
G	VONN LIGHTING #4PR-TL-L20-835-DIM-UNV-L-M-OF-CS-N	LED	3 WATTS/LF 277 V	31" DIAMETER SUSPENDED FIXTURE WITH SILVER FINISH. COMPLETE INSTALLATION DRAWINGS TO BE PROVIDED BY MANUFACTURER. SEE 5/E0.04 FOR ADDITIONAL INFORMATION.	2 LBS PER LF	3/E0.05 1/E0.01
₩	EVENLITE #LEX-20-1/2-6-W-VS			SELF-LUMINOUS LED EXIT SIGN WITH GREEN LETTERS AND WHITE BODY, CEILING OR WALL MOUNTED AS SHOWN ON PLANS AND TAMPER RESISTANT SCREWS	5 LBS	



GENERAL ELECTRICAL NOTES

3/4" = 1'-0"

- 1. ELECTRICAL CONTRACTOR IS TO PROVIDE LABOR, MATERIALS, TRANSPORTATION, EQUIPMENT, RELATED HAND TOOLS, SPECIAL AND OCCASIONAL SERVICES TO CONSTRUCT AND INSTALL THE COMPLETE ELECTRICAL SYSTEM AS SPECIFIED AND SHOWN ON THE PLANS.
- 2. MOUNTING HEIGHTS SHALL BE A MAXIMUM +48" TO TOP OF BOX OR MINIMUM 15" TO BOTTOM OF BOX PER CBC 1142A. ALL MOUNTING HEIGHTS SHALL BE AS SHOWN ON SYMBOL LIST UNLESS OTHERWISE NOTED ON DRAWINGS.
- 3. BONDING JUMPERS SHALL BE INSTALLED TO INSURE CONTINUITY WHERE CONDUIT CONNECTIONS AT CONCENTRIC KNOCKOUTS ARE TO SERVE AS A GROUND.
- 4. PROVIDE GREEN THWN COPPER GROUND WIRE FROM PANELBOARD GROUND BUS TO ALL BRANCH CIRCUITS.
- 5. THE ELECTRICIAN SHALL CHECK THE TIGHTNESS OF ALL PANELBOARD BUSES AND CIRCUIT BREAKER LUGS. COMPLETELY VACUUM AND CLEAN INTERIOR OF EQUIPMENT PRIOR TO TURN OVER TO THE OWNER.
- 6. ALL NEW AND EXISTING PANELBOARDS AND SWITCHBOARDS SHALL BE PROVIDED WITH NEW TYPEWRITTEN DIRECTORIES TO IDENTIFY THE LOCATION OF EACH LOAD
- 7. ALL EQUIPMENT SHALL BE U.L. LISTED AND INSTALLED AS PER LISTING OR LABELING (I.E. MAX. FUSE SIZES MEAN FUSE PROTECTION REQUIRED).
- 8. REFER TO ARCHITECTURAL DRAWINGS FOR ACTUAL LAYOUTS OF ALL LIGHTING FIXTURES AND EQUIPMENT.

1/2" = 1'-0"

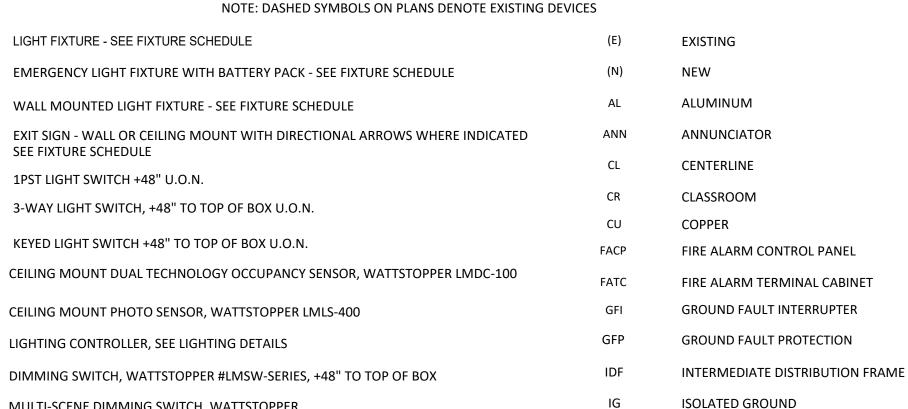
- 9. CONTRACTOR TO COORDINATE ALL NEW WORK WITH ALL OTHER TRADES FOR A SMOOTH FLOW OF INSTALLATION WORK.
- 10. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO ALL WALLS. FLOORS AND CEILINGS INCURRED DURING ELECTRICAL CONSTRUCTION. IF DAMAGE OCCURS DURING ELECTRICAL CONSTRUCTION, THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH GENERAL CONTRACTOR TO PATCH, PAINT AND REPAIR TO
- 11. COORDINATE EQUIPMENT LOCATIONS AND ELECTRICAL REQUIREMENTS OF ALL EQUIPMENT REQUIRING ELECTRICAL HOOK-UP WITH CONTRACTOR RESPONSIBLE FOR PROVIDING EQUIPMENT AND EQUIPMENT MANUFACTURER DATA SHEETS.
- 12. COORDINATE ELECTRICAL OUTLET LOCATIONS WITH ARCHITECTURAL ELEVATIONS (I.E. CABINETRY). AVOID ALL COUNTER SUPPORTS, AND LOCATIONS BEHIND INACCESSIBLE FIXED CABINETS.
- 13. UPON COMPLETION OF THE INSTALLATION OF THE FIRE PROTECTIVE SIGNALING EQUIPMENT, A SATISFACTORY TEST OF THE ENTIRE SYSTEM SHALL BE MADE IN THE PRESENCE OF THE ENFORCING FIRE AGENCY.
- 14. ALL CORRIDOR AND EXTERIOR WALL PENETRATIONS FOR PIPES, CONDUITS, ETC., IN WALLS REQUIRING PROTECTED OPENINGS SHALL BE FIRE STOPPED. FIRE STOP MATERIAL SHALL BE A TESTED ASSEMBLY APPROVED BY THE CALIFORNIA STATE FIRE MARSHAL.
- 15. ELECTRICAL CONTRACTOR SHALL REVIEW MECHANICAL AND PLUMBING CONTRACT DRAWINGS AND VERIFY ALL MECHANICAL EQUIPMENT LOCATIONS, MOTOR SIZES AND CONTROL WIRING REQUIREMENTS WITH MECHANICAL CONTRACTOR AND MECHANICAL EQUIPMENT SUPPLIERS AND MANUFACTURERS PRIOR TO INSTALLATION OF ELECTRICAL CONNECTIONS.
- 16. RECEPTACLES SHALL NOT BE INSTALLED BACK TO BACK AND SHALL BE SPACED 24" APART. WHERE RECEPTACLES CANNOT BE SPACED 24" APART, PROVIDE 3M FIRE RATED PUTTY PADS TO MATCH WALL FIRE RATING.
- 17. PROVIDE AN ISOLATED GROUND WIRE IN ADDITION TO NORMAL EQUIPMENT GROUND IN ALL COMPUTER DEDICATED CIRCUITS.
- 18. ALL CONTROL DEVICES TO BE USED BY THE OCCUPANT OF THE ROOM OR AREA SHALL BE INSTALLED AT A MINIMUM OF 36" C/L, TO A MAXIMUM OF 48" TO TOP OF BOX FROM THE FINISHED FLOOR.
- 19. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND ALTHOUGH THE SIZE AND LOCATIONS OF EQUIPMENT IS SHOWN TO SCALE WHEREVER POSSIBLE, CONTRACTOR SHALL MAKE USE OF MANUFACTURER'S OR OWNER'S DATA AVAILABLE AND/OR VERIFY DATA IN THE FIELD FOR PROVIDING AND INSTALLING CORRECT CABLE
- 20. ALL EQUIPMENT MUST BE LISTED, LABELED, OR CERTIFIED BY A NATIONAL RECOGNIZED TESTING LABORATORY (NRTL).
- 21. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ALL TRADES TO KEEP ELECTRICAL ROOMS EXCLUSIVELY DEDICATED TO PANELBOARDS, SIGNAL AND OTHER ELECTRICAL EQUIPMENT. NO PLUMBING, PIPING OR MECHANICAL DUCTS SHALL RUN OVER ELECTRICAL PANEL OR OTHER ELECTRICAL EQUIPMENT PER C.E.C.
- 22. ALL SWITCHES AND RECEPTACLES SHALL BE PROVIDED WITH 'BROTHER' LABELING SYSTEM TO IDENTIFY THE PANEL AND CIRCUIT NUMBER OF EACH OUTLET. COLOR TO BE 3/8" HIGH BLACK ON TRANSPARENT TAPE.
- 23. ALL CABINETS, DISCONNECT SWITCHES, PULLBOXES, AND TERMINAL BOXES SHALL BE PROVIDED WITH LABELING SYSTEM TO IDENTIFY THE PANEL AND ITS USE. SEE
- 24. MAINTAIN "AS-BUILT" RECORDS AT ALL TIMES, SHOWING EXACT LOCATION OF ALL UNDERGROUND AND/OR CONCEALED CONDUITS AND SERVICES INSTALLED UNDER THIS CONTRACT, INCLUDING CIRCUIT IDENTIFICATION WHERE APPLICABLE. PROVIDE OWNER WITH "AS-BUILT" DOCUMENTS AS INDICATED IN THE PROJECT MANUAL.
- 25. DRAWINGS INDICATE THE LOCATION OF DEVICES, FIXTURES AND EQUIPMENT AND THE CIRCUIT NUMBER AND PANEL DESIGNATION WHICH SUPPLIES THEM. THE CONTRACTOR SHALL VERIFY WITH ARCHITECT/VENDORS AND COORDINATE ALL LOCATIONS PRIOR TO INSTALLATION. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETELY CONNECTING ALL ELECTRICAL DEVICES TO CIRCUITS INDICATED ON THE DRAWINGS.
- 26. ALL EQUIPMENT GROUNDING SHALL CONFORM TO ARTICLE 250 OF THE NATIONAL ELECTRIC CODE, LATEST EDITION.
- 27. ALL EXTERIOR CONDUIT ABOVE GRADE INCLUDING ALL ROOF MOUNTED CONDUIT, SHALL BE RIGID GALVANIZED STEEL, U.O.N. COAT ALL EXPOSED THREADS WITH
- 28. ALL CONDUIT SHALL BE CONCEALED, UNLESS OTHERWISE NOTED.
- 29. ALL UNDERGROUND CONDUIT RUNS SHALL BE SEALED TO PREVENT GAS/MOISTURE ENTERING THE PIPE PER ARTICLE 230-8, 300.5 AND 300.50E.
- 30. PROVIDE EXPANSION FITTINGS AND/OR CONDUIT FLEX TO CONDUITS PASSING THROUGH STRUCTURAL EXPANSION JOINT SYSTEM. VERIFY/COORDINATE WITH ARCHITECT FOR LOCATION.
- 31. ALL SIGNAL WIRING/CABLING(TELEPHONE/INTERCOM/DATA/FIRE ALARM/CATV/INTRUSION ALARM SYSTEMS) SHALL BE NEATLY TERMINATED WITH TERMINAL BLOCKS AND LABELED WITH WIRE MARKERS AT ITS CABINETS/PANELS.
- 32. ALL RACEWAY PASSING THROUGH EXPANSION JOINT AREA SHALL BE PROVIDED WITH EXPANSION JOINT FITTINGS AND/OR FLEX CONDUIT AS REQUIRED.
- 33. ALL FIXTURES WITH EMERGENCY BATTERY PACK SHALL BE PROVIDED WITH UNSWITCHED HOT.
- 34. ALL EXTERIOR MOUNTED GFI RECEPTACLE OUTLETS TO BE PROVIDED WITH LOCKABLE COVERS, TAYMAC MX3200. 35. FOR POWER AND LIGHTING CIRCUITS, CONTRACTOR SHALL PROVIDE SEPARATE NEUTRAL FOR EACH CIRCUIT IN THE RACEWAY OR PROVIDE BREAKER TIES TO MEET
- 36. ALL EQUIPMENT/COMPONENTS/DEVICES INSTALLED OUTDOOR SHALL BE U.L. LISTED FOR WET LOCATION.
- 37. THE CONTRACTOR SHALL VERIFY WITH THE ARCHITECTURAL DRAWINGS ALL LOCATIONS AND DIMENSIONS OF DEVICES/EQUIPMENT PRIOR TO ROUGH-IN.
- 38. ALL EXIT SIGNS SHALL COMPLY WITH SECTIONS 1013 OF THE C.B.C.
- 39. ALL DIVISION 25 EQUIPMENT LOW VOLTAGE CONTROL WIRING SHALL BE PROVIDED AND INSTALLED BY DIVISION 25 U.O.N. PROVIDE CONDUIT WHERE REQUIRED BY
- 40. COORDINATE INSTALLATION OF ALL RECESSED LIGHT FIXTURES WITH DIVISION 15 PRIOR TO INSTALLATION OF HVAC DUCTS AND SPRINKLER HEADS. ENSURE AFTER INSTALLATION OF FIXTURES THAT THERE IS NO CONTACT BETWEEN DUCTS AND FIXTURES TO AVOID VIBRATION IN FIXTURES.
- 41. ALL CONDUIT STUB OUTS AND CONDUITS TERMINATING TO A J-BOX, CABINET, AND THE LIKE SHALL BE PROVIDED WITH INSULATED THROAT. BOX OR CABINET COVER SHALL BE LABELED AS TO USE.
- ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. WHERE NO DETAIL IS INDICATED, THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2019 CBC, SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTER 13, 26 AND 30.
- ALL PERMANENT EQUIPMENT AND COMPONENTS.
- TEMPORARY, MOVABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY,
- GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A FLEXIBLE TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.
- THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT THE ATTACHMENT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS:
- A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT B. COMPONENTS WEIGHING LESS THAN 20 POUNDS OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A
- ROOF OR FLOOR OR HUNG FROM A WALL.
- THE ANCHORAGE OF ALL MECHANICAL. ELECTRICAL AND PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH ABOVE REQUIREMENTS.
- PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE
- PIPING, DUCTWORK AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTION 13.6.5, 13.6.6, 13.6.7, 13.6.8; AND 2019 CBC, SECTIONS 1617A.1.24, 1617A.1.25 AND 1617A.1.26.
- THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. WHEN BRACING AND ATTACHMENTS ARE BASED ON A PREAPPROVED INSTALLATION GUIDE (E.G. OSHPD OPM FOR 2013 CBC OR LATER), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF AND DURING THE HANGING AND BRACING OF THE DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

MP☐ MD☐ PP☐ E☒ - OPTION 1: DETAILED ON THE APPROVED DRAWINGS WITH PROJECT SPECIFIC NOTES AND DETAILS.

ELECTRICAL SYMBOL LIST

1 1/2" = 1'-0"



MULTI-SCENE DIMMING SWITCH, WATTSTOPPER WALL MOUNT OCCUPANCY SENSOR, +48" TO TOP OF BOX DIMMING SWITCH WITH OCC SENSOR, LUTRON MS-Z101-XX

20A, 125V, 3W GROUNDING TYPE DUPLEX RECEPTACLE, +18" U.O.N. 20A, 125V, 4W DUPLEX RECEPTACLE, CEILING MOUNTED

20A, 125V, 3W GROUNDING TYPE, FOURPLEX RECEPTACLE, +18" U.O.N.

20A, 125V, 3W GROUNDING TYPE DUPLEX RECEPTACLE, MOUNTED HORIZONTALLY 20A, 125V DUPLEX GFI RECEPTACLE, +18" U.O.N.

20A, 125V DUPLEX GFI RECEPTACLE WITH ONE SWITCHED PLUG SPECIAL RECEPTACLE AS REQUIRED BY EQUIPMENT SPECIFIED

JUNCTION BOX, CEILING OR WALL MOUNTED - SIZED PER CODE DATA JUNCTION BOX FOR SECURITY CAMERA. WP INDICATES WEATHERPROOF

AV WALL PLATE DUPLEX DATA OUTLET +18" U.O.N. FOURPLEX OUTLET +18" U.O.N.

TELEPHONE OUTLET +48" TO TOP OF BOX WIRELESS ACCESS POINT

1" = 1'-0"

INTRUSION ALARM KEYPAD BACKBOX WITH 3/4" CONDUIT TO IACP LOCATION INTRUSION ALARM MOTION SENSOR BACKBOX WITH 3/4" CONDUIT TO IACP LOCATION

INTRUSION ALARM KEYCARD INTRUSION ALARM DOOR CONTACT

INTERCOM SYSTEM CLOCK/SPEAKER UNIT PAGING SPEAKER - CEILING OR WALL MOUNTED

VAPE SENSOR

FIRE ALARM CONTROL PANEL (FACP) FIRE ALARM REMOTE POWER SUPPLY

FIRE ALARM SMOKE DETECTOR

200° FIXED HEAT DETECTOR 135° FIXED HEAT DETECTOR

FIRE ALARM HORN/STROBE, CEILING OR WALL MOUNTED, CANDELA AS NOTED

FIRE ALARM STROBE, CANDELA AS NOTED ADDRESSABLE MONITOR MODULE ADDRESSABLE CONTROL RELAY

END OF LINE RESISTOR DISCONNECT SWITCH - FUSED AS REQUIRED, WEATHERPROOF FOR

THERMAL OVERLOAD SWITCH

OUTDOORS, SIZED PER MANUFACTURER'S REQUIREMENTS MOTOR CONNECTION

MANUAL MOTOR STARTING SWITCH, HORSE POWER RATED WITH OVERLOADS EXISTING CONDUIT

BRANCH CIRCUIT CONDUIT CONCEALED IN WALL OR CEILING

BRANCH CIRCUIT CONDUIT CONCEALED UNDER FLOOR OR UNDERGROUND HOMERUN TO PANELBOARD OR OTHER TERMINATION POINT

STUB CONDUIT TO ACCESSIBLE SPACE

- CONDUIT UP
- CONDUIT DOWN

ANY BRANCH CIRCUIT CONDUIT SHALL BE MINIMUM 3/4"C - 2#12, 1#12 GREEN GROUND UNLESS OTHERWISE NOTED. FOR A GREATER NUMBER OF #12 WIRES: (- HH = 3/4"C - 3#12, 1#12G) ETC. FOR WIRE SIZES OTHER THAN #12: (— HH ... = 3#8, 1#12G), (GROUND SIZED PER CEC, IN CODE SIZE CONDUIT) ETC. #8

APPROVED IV. OF THE STATE ARCHITE APP: 01-119449 INC: REVIEWED FOR SS FLS ACS DATE: 10/19/2021

IF THIS SHEET IS NOT 30"x42", IT IS A REDUCED PRINT; SCALE ACCORDINGLY

3" = 1'-0"

ISOLATED GROUND BUS

REMOTE POWER SUPPLY

PULL BOX

MAIN DISTRIBUTION FRAME

EMPTY CONDUIT WITH PULL CORD

SEE ARCHITECTURAL DRAWINGS

TELECOMMUNICATIONS MAIN GROUNDING BUS BAR

FIXTURE TAG - LETTER DENOTES TYPE, NUMBERS

MECHANICAL TAG - LETTER DENOTES TYPE, NUMBER

INDICATE LAMP QUANTITY AND WATTAGE

SIGNAL TERMINAL CABINET

TELEPHONE TERMINAL BOARD

UNLESS OTHERWISE NOTED

NUMBERED ELECTRICAL NOTE

DENOTES EQUIPMENT NUMBER

WEATHERPROOF

UNDERGROUND

VERIFY IN FIELD

TRANSFORMER

#\ Revisions ADDENDUM #1 TLK 8/12/21

AGENCY APPROVAL

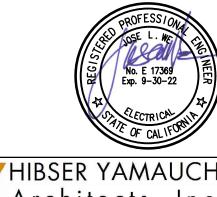


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20-065

This document is the property of the Owner and is not to be used without his written

rchitect/Engineer Of Record:



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SAN RAFAEL HIGH SCHOOL 150 3RD STREET, SAN RAFAEL, CA 94901

AD BUILDING REMODEL

ELECTRICAL SYMBOLS, NOTES AND

Client Project Number:

SCHEDULES

AS NOTED DAM Drawn By: Checked By: TLK

Issue Date: 04/19/2021

Revit Version: 2019

Client Proj. #

GRAPHIC SCALES: 1/8" = 1'-0" 1/4" = 1'-0" **EXISTING PANEL 1A** 1ST FLOOR DESCRIPTION DESCRIPTION (E) RECEPTACLE (E) RECEPTACLE LIGHTING OFFICE RECEPTACLE LIGHTING OFFICE E) RECEPTACLE MICROWAVE LIGHTING MAIN THEATER CORRIDOR EXIT E) RECEPTACLE LIGHTING LOBBY LTS. EXIT E) RECEPTACLE LIGHTING TECH RM EMERGENCY E) RECEPTACLE TECH ROOM RECEP COPIER BATHROOM DRYER BOYS) RECEPTACLE CORRIDOR RECEPTACLE TECH ROOM RECEP TECH ROOM RECEP MOTOR SAC-A1

DESCRIPTION RCPT RCPT	LTG.	REC.	(KVA)							LOAD (KVA)				DECORPORA	
CCPT			RES.	MOT.	СВ	CKT	SN	CKT	СВ	LTG.	REC.	RES.	MOT.	DESCRIPTION	
					20/1	1	*	2	20/1					OFFICE LIGHTS	
RCPT					20/1	3	*	4	20/1					OFFICE CORR. LIGHTS	
					20/1	5	*	6	20/1					OFFICE LIGHTS	
RCPT					20/1	7	*	8	20/1					MAIN CORR.	
RCPT					20/1	9	*	10	20/1					SPARE	
RCPT					20/1	11	*	12	20/1					SPARE	
OPIER					20/1	13	*	14	20/1					SPARE	
RCPT					20/1	15	*	16	20/1					SPARE	
RCPT CONF.					20/1	17	*	18	20/1					SPARE	
RCPT					20/1	19	*	20	20/1					SPARE	
RCPT					20/1	21	*	22	20/1					SPARE	
RCPT					20/1	23	*	24	20/1					SPARE	
RCPT					20/1	25	*	26	20/1					SPARE	
PARE					20/1	27	*	28	20/1					SPARE	
SPARE					20/1	29	*	30	20/1					SPARE	
SPARE					20/1	31	*	32	20/1					SPARE	
PARE					20/1	33	*	34	20/1					SPARE	
SPARE					20/1	35	*	36	20/1					SPARE	
PARE					20/1	37	*	38	20/1					SPARE	
SPARE					20/1	39	*	40	20/1					SPARE	
PARE					20/1	41	*	42	20/1					SPARE	
OTAL															
/OLTS: 120/208V,3ø,4W M	TG: SURFA	CE													
BUS: 100 AMP T	/PE:		3 0						CONN	IECTED	KVA:				

CONNECTED KVA:

CONNECTED AMPS:

PANEL NOTES:

VOLTS: 120/208V,3ø,4W

100 AMP

MTG: SURFACE

① EXISTING CIRCUIT TO BE DISCONNECTED AND RE-USED.

2 RECONNECT EXISTING CIRCUIT.

		LOAD	(KVA)								LOAD	(KVA)				
DESCRIPTION	LTG.	REC.	RES.	MOT.	СВ	CKT	SN	CKT	СВ	LTG.	REC.	RES.	MOT.	DESCRIPTION		
RCPT					20/1	1	*	2	20/1					LIGHTS		
WIREMOLD					20/1	3	*	4	20/1					OFFICE LIGHTS		
WIREMOLD					20/1	5	*	6	20/1					OFFICE/LOUNGE		
RCPT					20/1	7	*	8	20/1					LIGHTS		
RCPT					20/1	9	*	10	20/1					MAIN CORR. LIGHTS		
RCPT	0				20/1	11	*	12	20/1					MAIN CORR. LIGHTS		
RCPT					20/1	13	*	14	20/1					IDF		
IDF					20/1	15	*	16	25/2					EWH-1		
RCPT					20/1	17	*	18	20/2					EVVIII-1		
COPIER					20/1	19	*	20	50/2					RANGE		
RCPT					20/1	21	*	22	30/2					KANGE		
RCPT LOUNGE					20/1	23	*	24	20/1					RANGE HOOD		
COPIER					20/1	25	*	26	20/1					FSD		
RCPT					20/1	27	*	28	20/1					SPARE		
RCPT					20/1	29	*	30	20/1					SPARE		
RCPT					20/1	31	*	32	20/1					SPARE		
XLS					20/1	33	*	34	20/1					SPARE		
SPARE					20/1	35	*	36	20/1					SPARE		
SPARE					20/1	37	*	38	20/1					SPARE		
SPARE					20/1	39	*	40	20/1					SPARE		
SPARE					20/1	41	*	42	20/1					SPARE		
TOTAL																
VOLTS: 120/208V,3ø,4W MT	G: SURFA	CE														
BUS: 125 AMP TY	PE:		-						CONN	IECTED	KVA:					
MAIN: KA	IC.		-,						CONIN	IECTED	AMPS			_		

		LOAD	(KVA)							LOAD (KVA)				[
DESCRIPTION	Lī		 	MOT.	СВ	CKT	SN	CKT	СВ	LTG.	REC.	RES.	MOT.	DESCRIPTION	
RECEPTS - CR #1		0.70	,,,_,		20/1	1	*	2	20/1	0.70				LIGHTING - CR 3	
RECEPTS - CR #1		0.70			20/1	3	*	4	20/1	0.70				LIGHTING - CR 2	
RECEPTS - CR #2		0.70			20/1	5	*	6	20/1	0.70				LIGHTING - CR 1	
RECEPTS - CR #2		0.70			20/1	7	*	8	20/1					LIGHTING MAIN THEATER CORRIDOR EXIT	
RECEPTS - CR #3		0.70			20/1	9	*	10	20/1					LIGHTING LOBBY LTS. EXIT	
RECEPTS - CR #3		0.70			20/1	11	*	12	20/1					LIGHTING TECH RM EMERGENCY	
SPARE					20/1	13	*	14	20/1					TECH ROOM RECEP	
SPARE					20/1	15	*	16	20/1					BATHROOM DRYER BOYS	
SPARE					20/1	17	*	18	20/1					SPARE	
(E) CORRIDOR RECEPTACLE					20/1	19	*	20	20/1					TECH ROOM RECEP	
(E) FSD					20/1	21	*	22	20/1					SPARE	
SPARE					20/1	23	*	24	20/1					SPARE	
SPARE					20/1	25	*	26	20/1					TECH ROOM RECEP	
SPARE					20/1	27	*	28	20/1					MOTOR SAC-A1	
SPARE			1		20/1	29	*	30	20/1					SPARE	
SPARE					20/1	31	*	32	20/1					SPARE	
SPARE					20/1	33	*	34	20/1					SPARE	
SPARE					20/1	35	*	36	20/1					SPARE	
SPARE					20/1	37	*	38	20/1					SPARE	
BSB AND FC UNITS				1.30	15/2	39	*	40	20/1					SPARE	
BOB AIND TO CINITO				1.00	10/2	41	*	42	20/1					SPARE	
TOTAL		4.20		1.30						2.10					
VOLTS: 120/208V,3ø,4W	MTG: SUF	RFACE													
BUS: 100 AMP	TYPE:		_						CONN	IECTED	KVA:	7.	60		
MAIN:	KAIC:		-						CONN	IECTED	AMPS:	21	11		

3/4" = 1'-0"

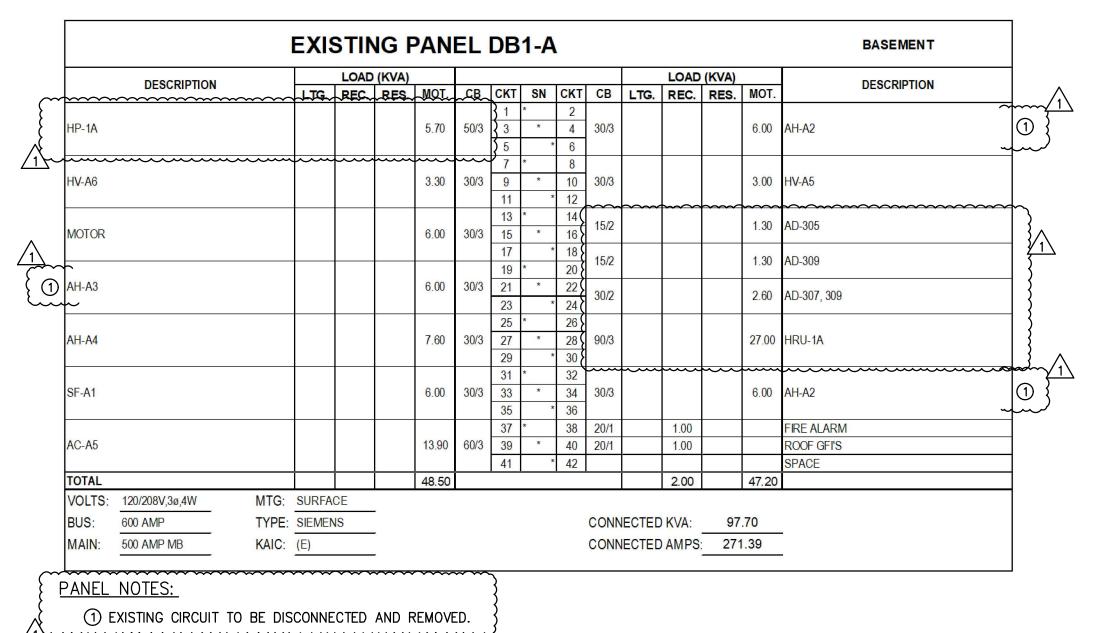
1" = 1'-0"

PANEL NOTES: 1 RECONNECT EXISTING CIRCUIT.

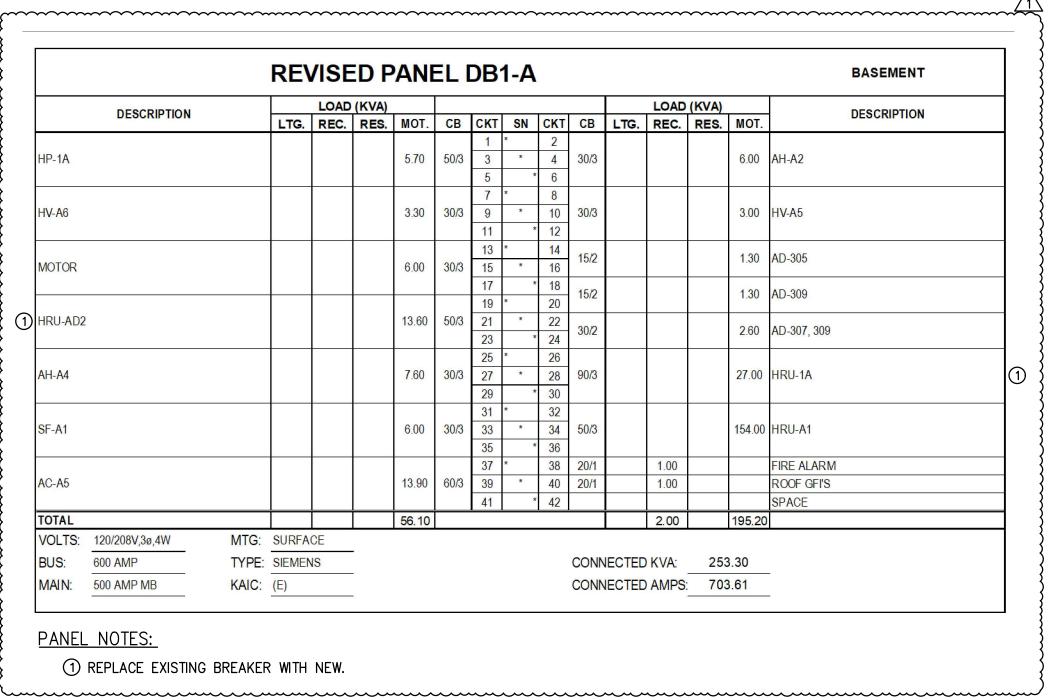
DECORIDE		LOAD	(KVA)							LOAD (KVA)				D. F. G. D. D. T. G. W.
DESCRIPTION	LTG.	REC.	RES.	MOT.	СВ	CKT	SN	CKT	СВ	LTG.	REC.	RES.	MOT.	DESCRIPTION
RECEPTS - TOILETS		0.70			20/1	1	*	2	20/1	0.70				LTG - TOILETS, BREAKOUT
RECEPTS - OFFICES 2		0.70			20/1	3	*	4	20/1	0.70				LTG - CR 4
RECEPTS - OFFICES		0.70			20/1	5	9	6	20/1	0.70				LTG - CR 6
RECEPTS - OFFICES		0.70			20/1	7	*	8	20/1	1.00				LTG-MAIN CORR
RECEPTS - OFFICES		0.70			20/1	9	*	10	20/1		0.54			RECEPTS - WAITING
RECEPTS - OFFICES }		0.70			20/1	11	,	12	20/1		0.54			RECEPTS - CONF ROOM
RECEPTS - CR 5		0.70			20/1	13	*	14	20/1		0.36			RECEPTS - WAIT, CONF ROOM
RECEPTS - CR 5		0.70			20/1	15	*	16	20/1					SPARE
RECEPTS - CR 5		0.70			20/1	17	,	18	20/1			,		SPARE
RECEPTS - CR 5		0.70			20/1	19	*	20	20/1					SPARE
RECEPTS - CR 5		0.70			20/1	21	*	22	20/1					SPARE
RECEPTS - CR 5		0.70			20/1	23	,	24	20/1					SPARE
SPARE					20/1	25	*	26	20/1					SPARE
SPARE					20/1	27	*	28	20/1					SPARE
SPARE					20/1	29	,	30	20/1					SPARE
PARE					20/1	31	*	32	20/1					SPARE
SPARE					20/1	33	*	34	20/1					SPARE
SPARE			$L/1 \setminus$		20/1	35	,	36	20/1					SPARE
PARE			$ \mathcal{T} $		20/1	37	*	38	20/1					SPARE
SSB AND FC UNITS			{	1.60	15/2	39	*	40	20/1					SPARE
SOB AND FO GIVING				1.00	10/2	41		42	20/1					SPARE
OTAL		8.40		1.60						3.10	1.44	÷		
/OLTS: 120/208V,3ø,4W M	TG: SURFA	CE												
BUS: 100 AMP T	YPE:		_						CONN	IECTED	K\/A·	14	.54	

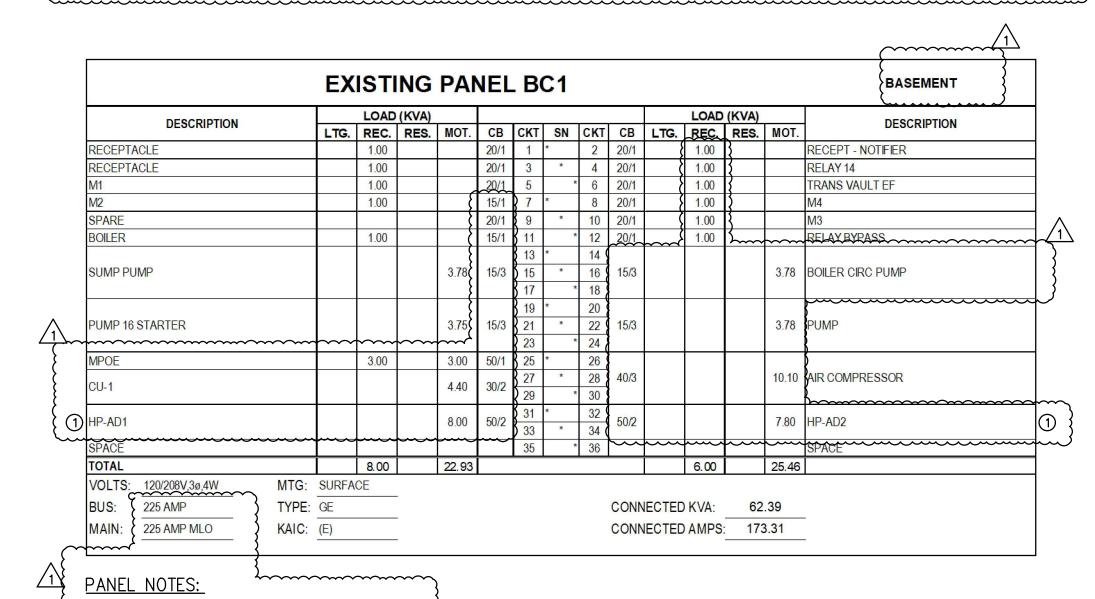
PANEL NOTES:

① INSTALL NEW BREAKER.



1 1/2" = 1'-0"





1) INSTALL NEW BREAKER IN EXISTING SPACE.

~~~~<del>\</del> **EXISTING PANEL BC2** BASEMENT LOAD (KVA)

LTG. REC. RES. MOT. CB CKT SN CKT CB LTG. REC. RES. MOT. DESCRIPTION DESCRIPTION 3.70 PUMP 15 STARTER 5.00 PUMP 14 STARTER VOLTS: 120/208V,3ø,4W BUS: 225 AMP MTG: SURFACE TYPE: SIEMENS CONNECTED KVA: 60.80 225 AMP MLO KAIC: (E) CONNECTED AMPS: 168.89





IF THIS SHEET IS NOT 30"x42", IT IS A REDUCED PRINT; SCALE ACCORDINGLY

3" = 1'-0"

| Revi        | isions      |     |         |       |
|-------------|-------------|-----|---------|-------|
| No.         | Revisions   | Ву  | Date    | Appr. |
| $\triangle$ | ADDENDUM #1 | TLK | 8/12/21 |       |
|             |             | •   |         |       |

**AGENCY APPROVAL** 



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HIBSER YAMAUCHI Architects, Inc. 300 – 27<sup>th</sup> Street Oakland, CA 94612

510.446.2222 tel¦510.446.2211 fax HY ARCHITECTS JOB NUMBER

SAN RAFAEL HIGH SCHOOL 150 3RD STREET, SAN RAFAEL, CA 94901

AD BUILDING REMODEL

**ELECTRICAL PANEL SCHEDULES** 

Client Project Number: Client Proj. #

AS NOTED Drawn By: DAM Checked By: TLK Issue Date: 04/19/2021

E0.03 Revit Version: 2019

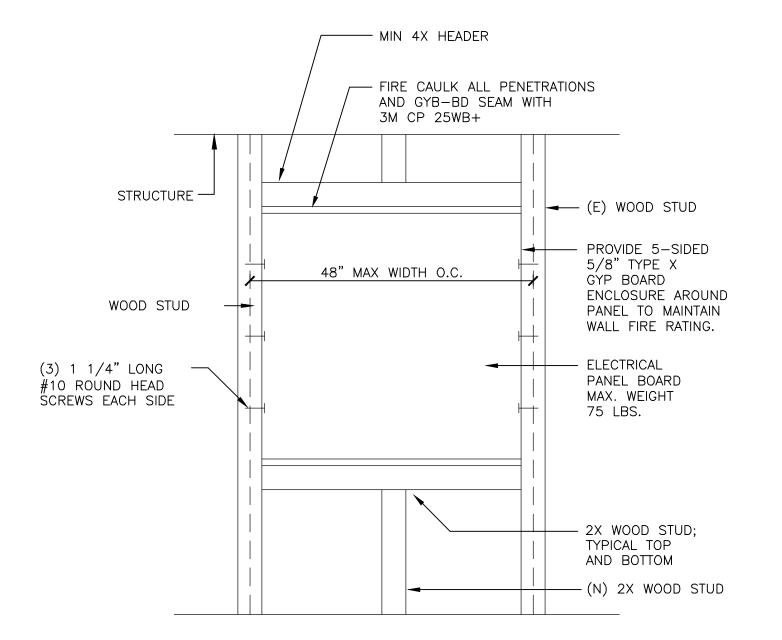


By Date Appr.

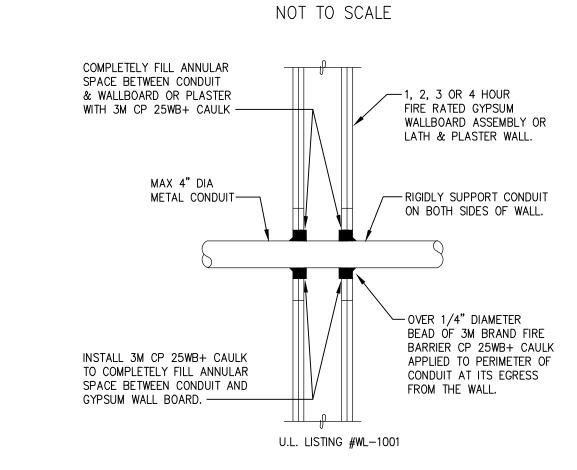
TLK 8/12/21

ADDENDUM #1

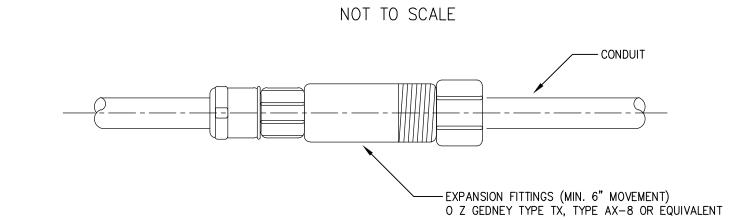
**AGENCY APPROVAL** 



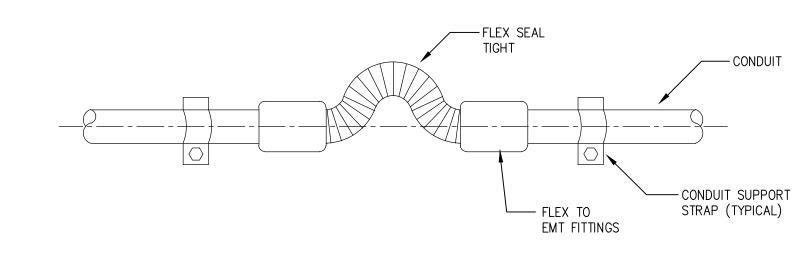
# RECESSED PANELBOARD MOUNTING DETAIL IN WOOD CONSTRUCTION



# CONDUIT PENETRATION DETAIL FOR FIRE RATED WALL

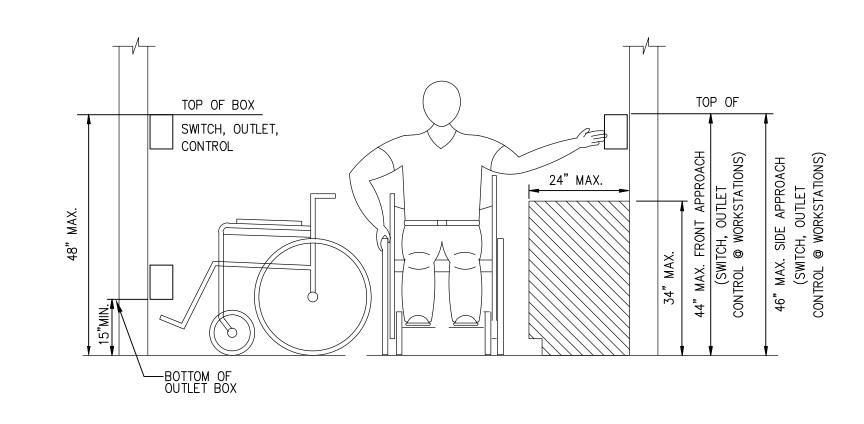


# (A) FITTINGS FOR CONDUITS ON WALL

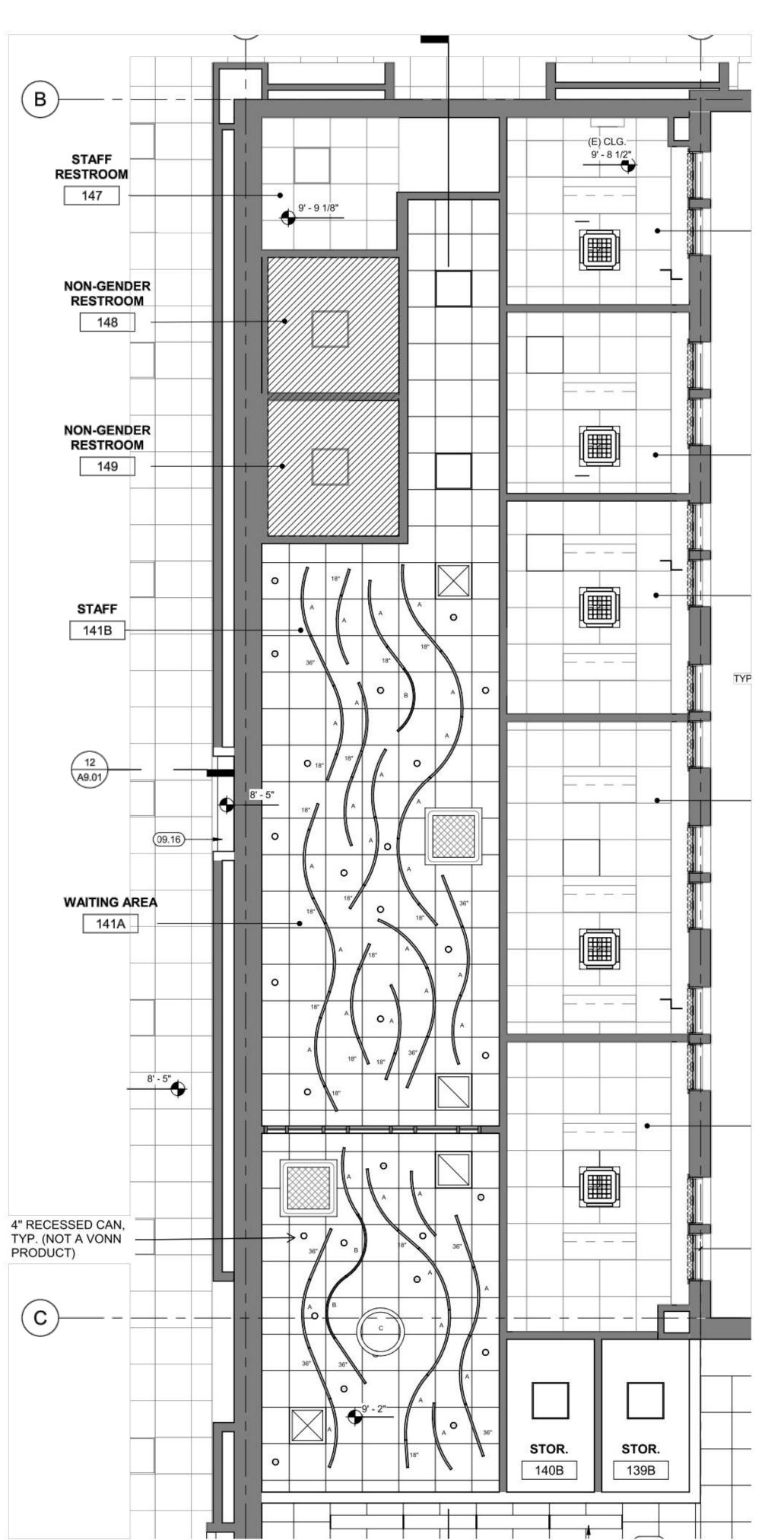


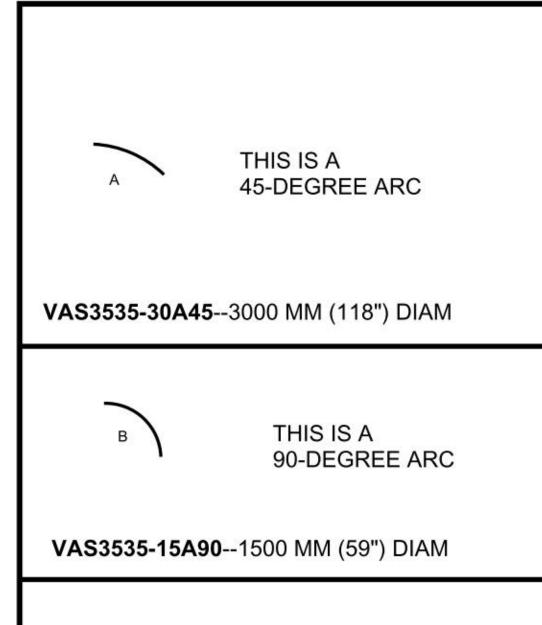
# B FLEX JOINT FOR EXPOSED CONDUIT

## CONDUIT EXPANSION FITTING DETAILS NOT TO SCALE



TYPICAL DEVICE MOUNTING DETAIL





THIS IS A COMPLETE CIRCLE

VAS3535-08A360--800 MM (31") DIAM

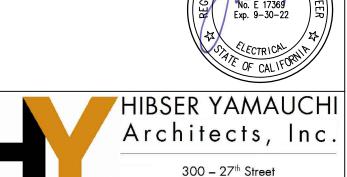
THESE ARE CUT **SEGMENTS** 

VAS3535-2500--STRAIGHT, 2500 MM (8.2") LONG

**VONN VAS3535 SERIES PRODUCT DIMENSIONS** 



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300 - 27th Street 510.446.2222 tel ¦ 510.446.2211 fax HY ARCHITECTS JOB NUMBER

SAN RAFAEL HIGH SCHOOL 150 3RD STREET, SAN RAFAEL, CA 94901

AD BUILDING REMODEL

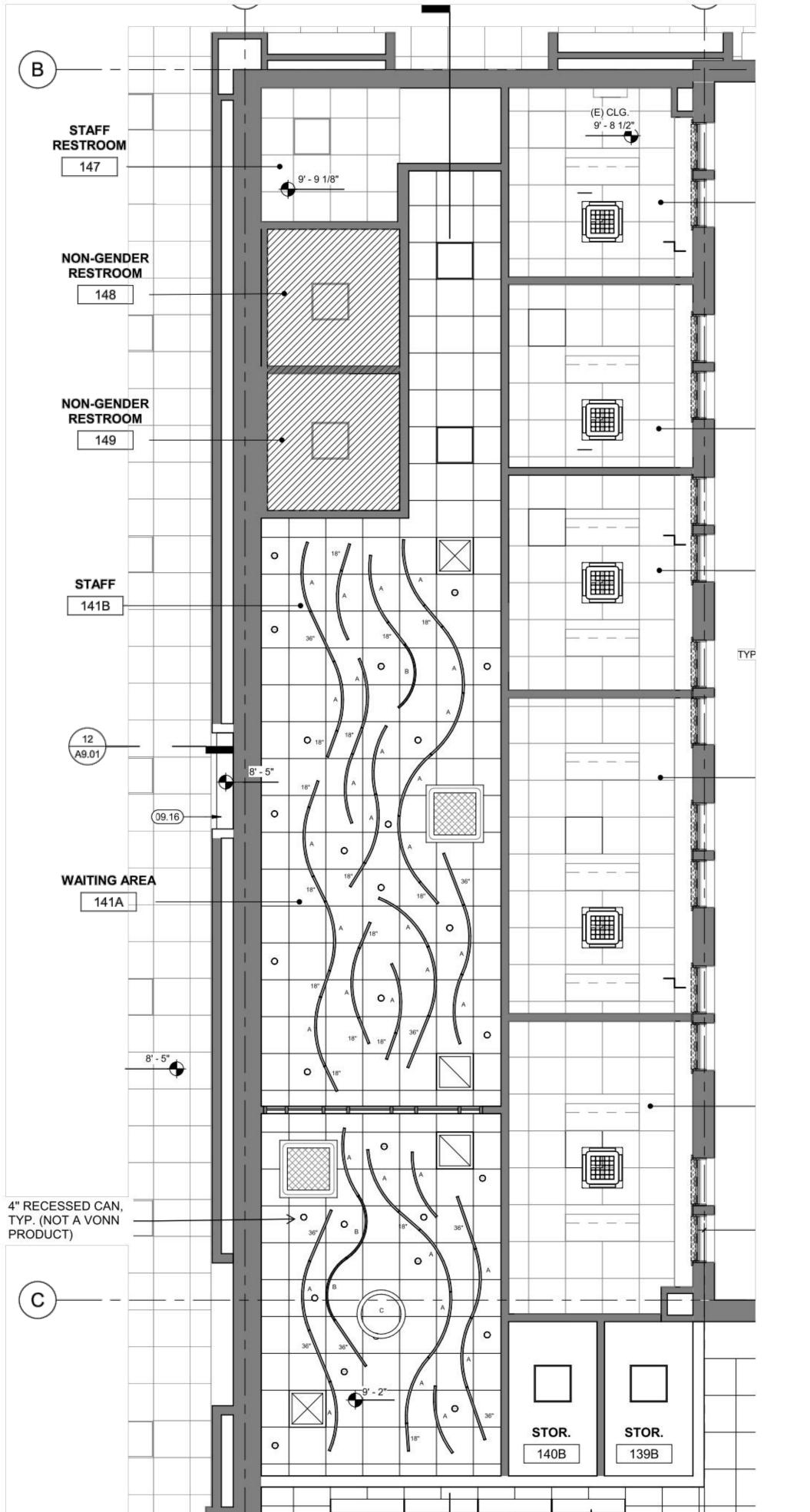
ELECTRICAL DETAILS

Client Project Number:

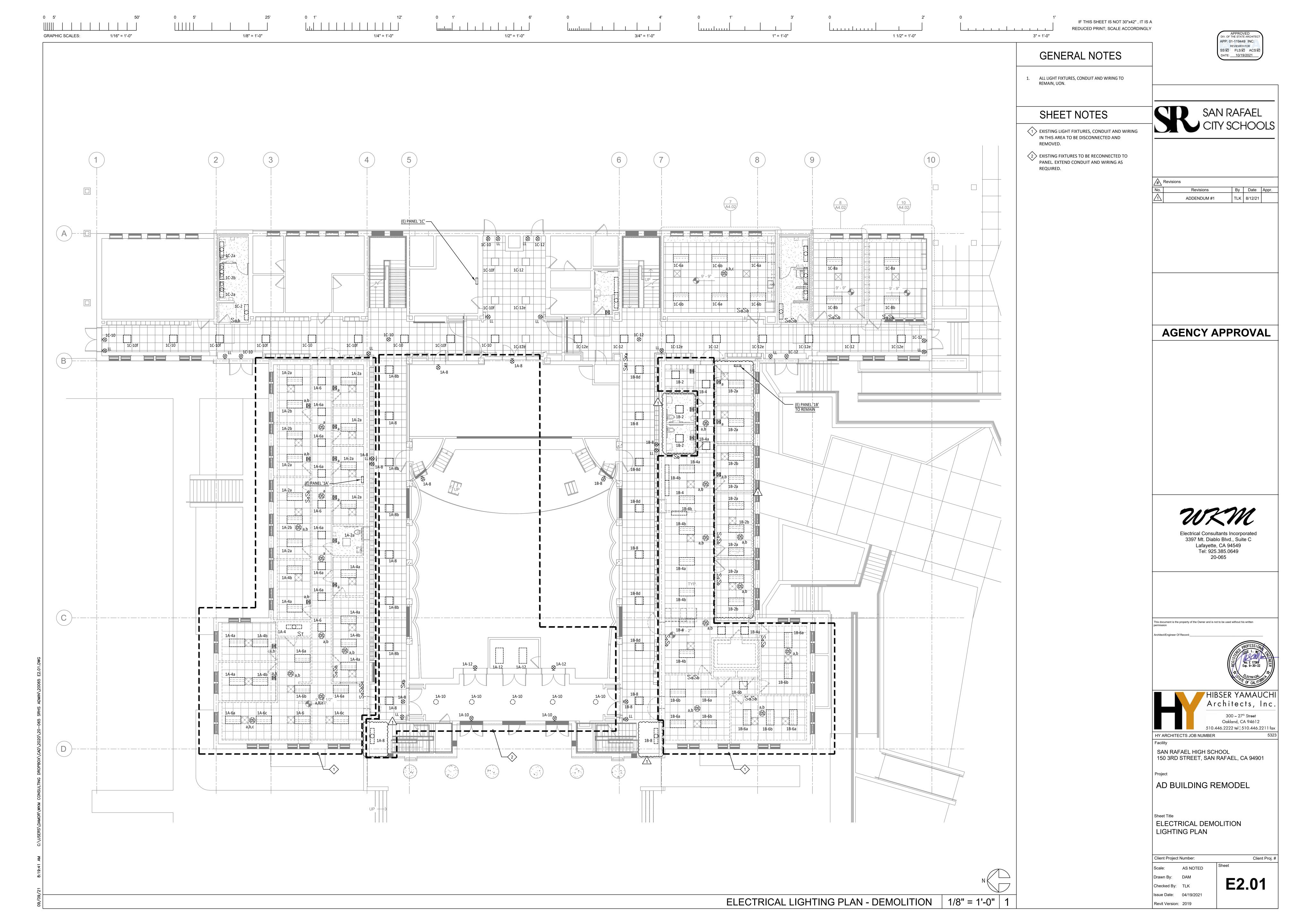
Checked By: TLK Issue Date: 04/19/2021

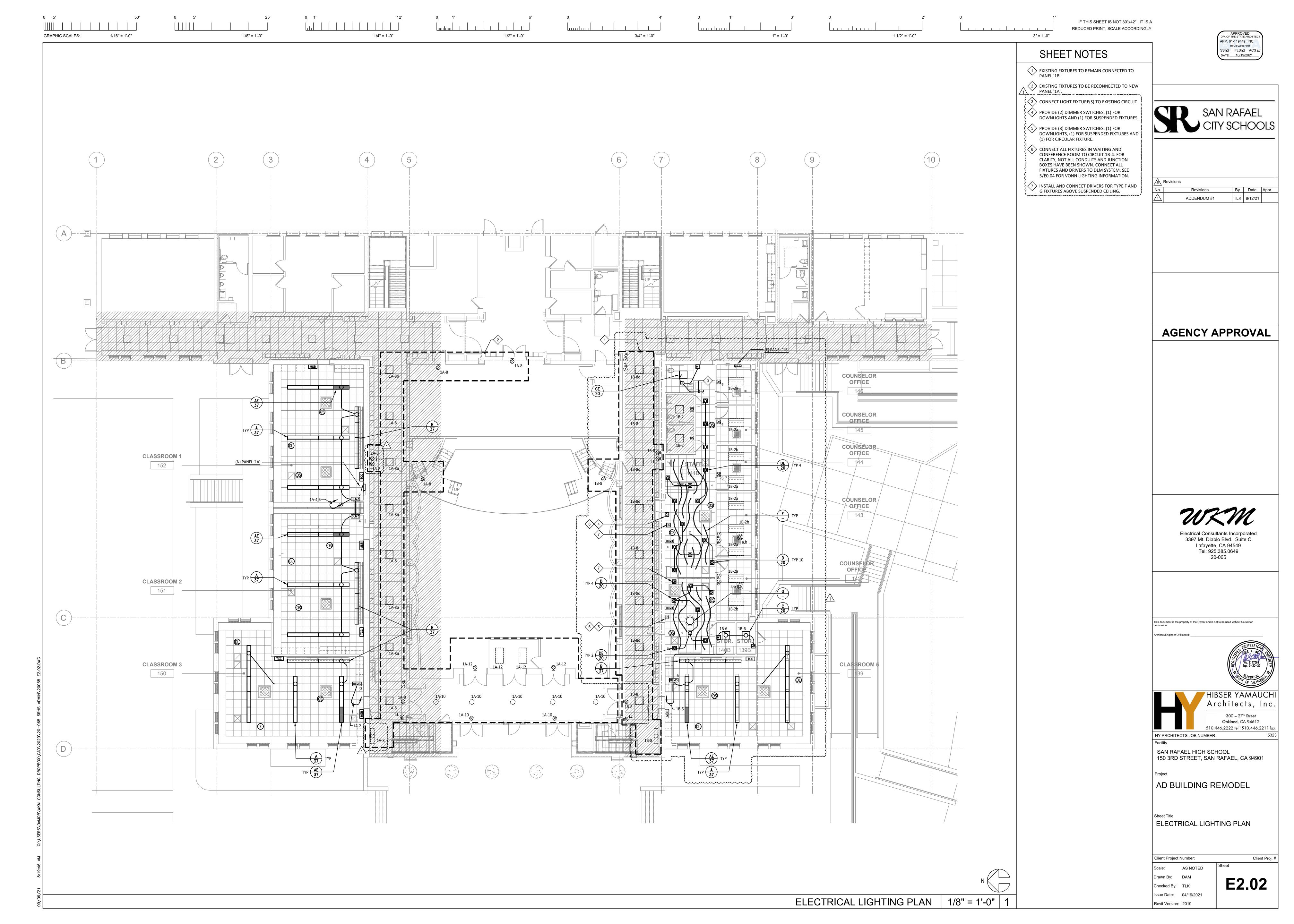
E0.04 Revit Version: 2019

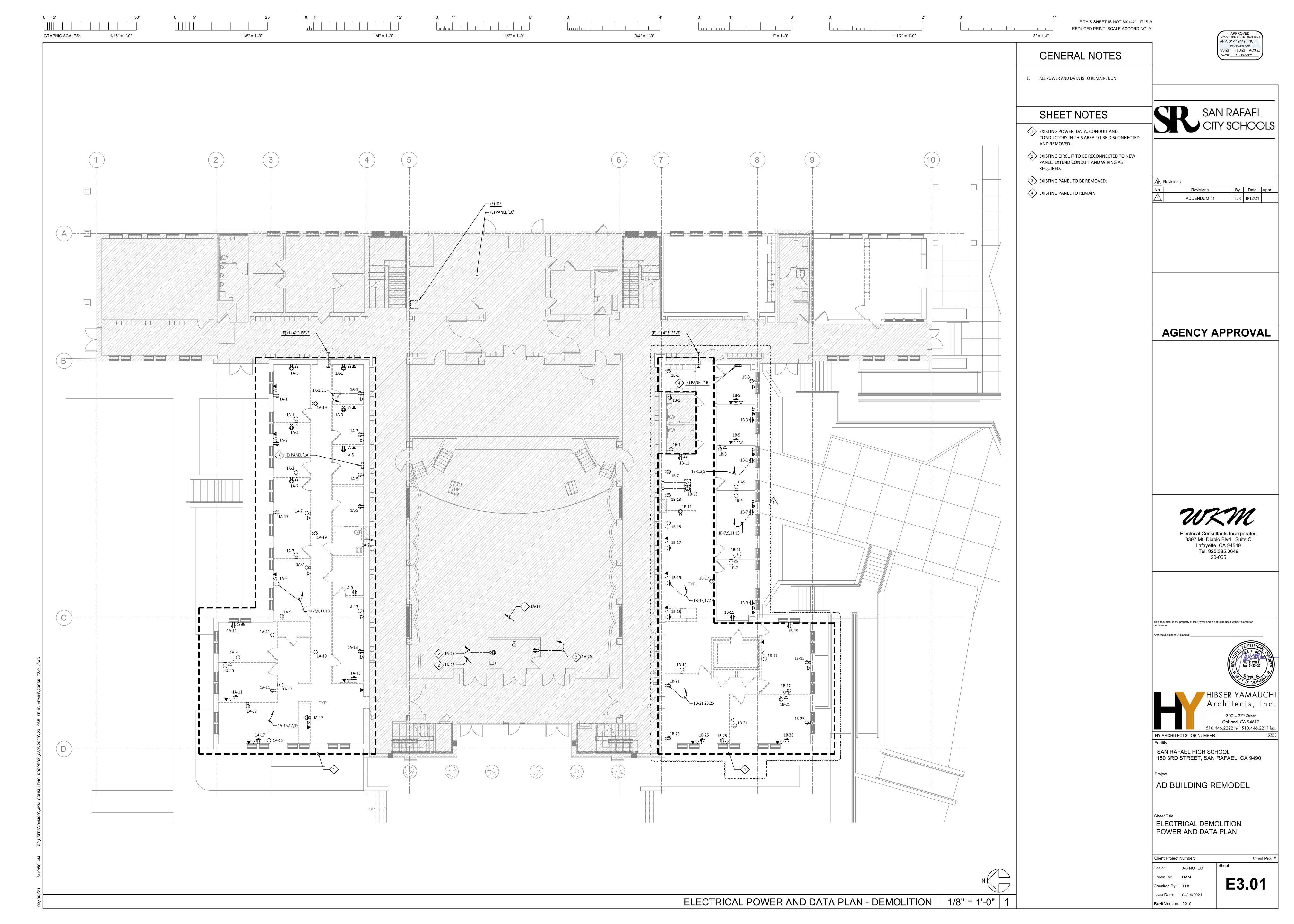
Client Proj. #

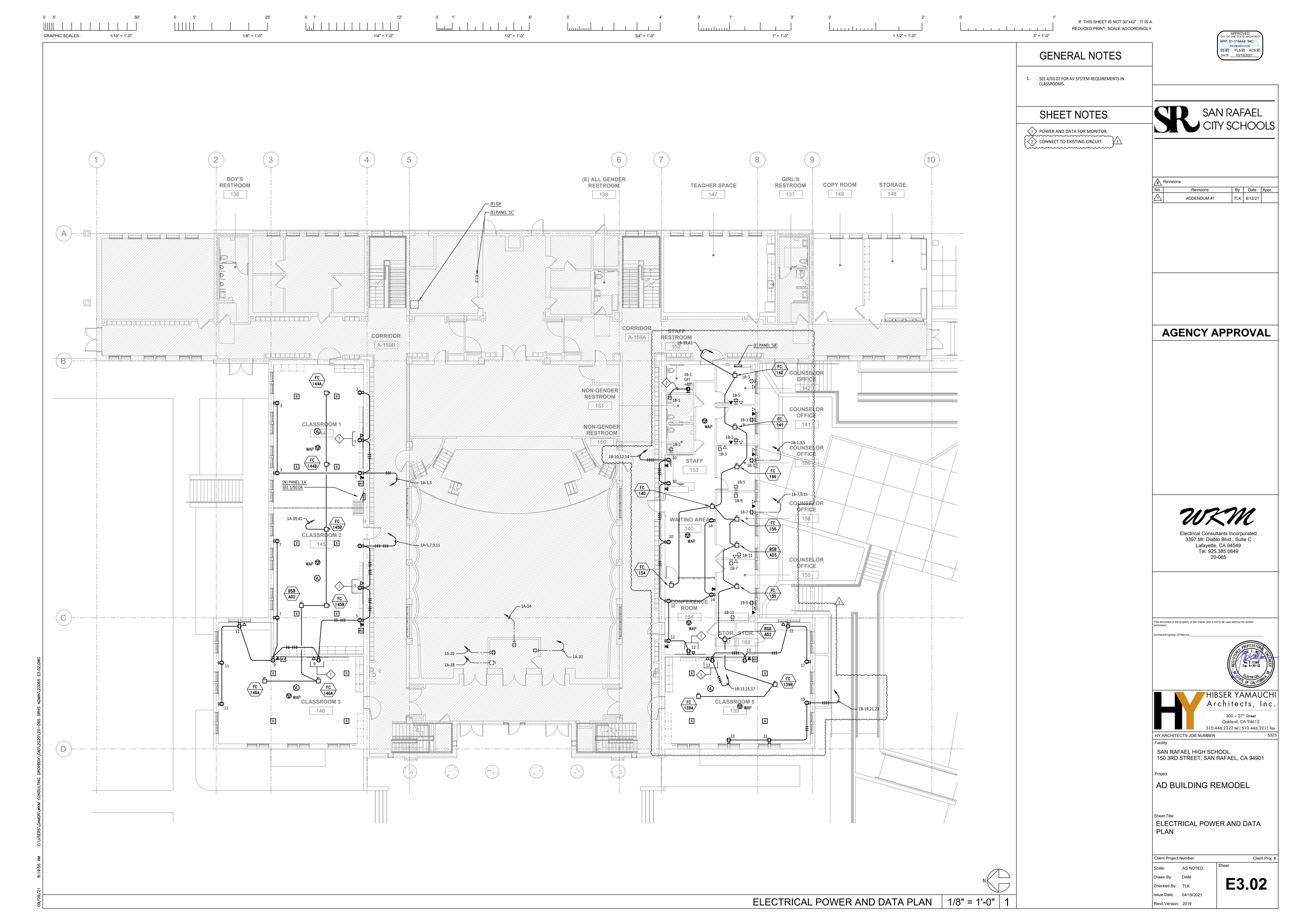


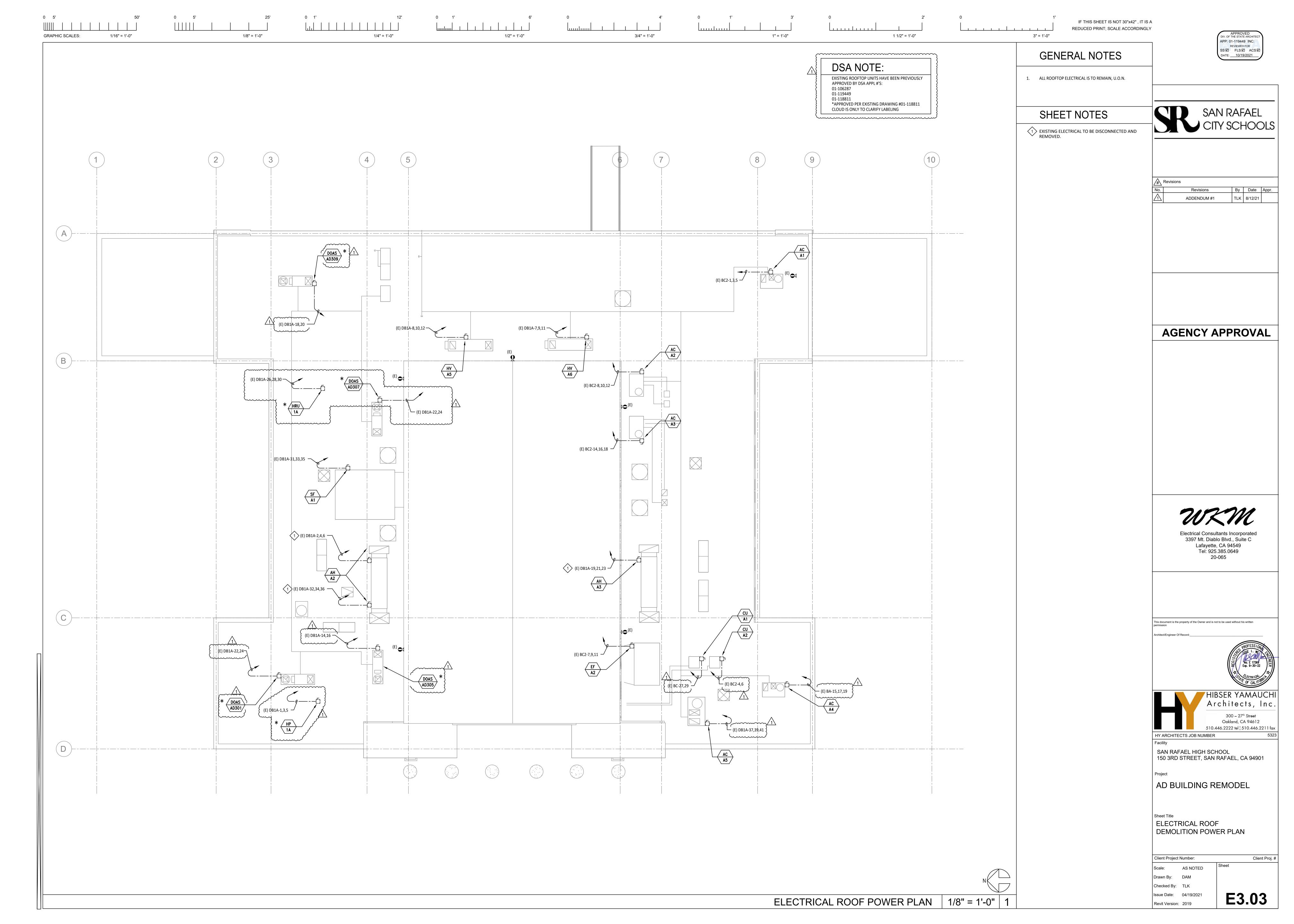
5 VONN LIGHTING PLAN AND SCHEDULE

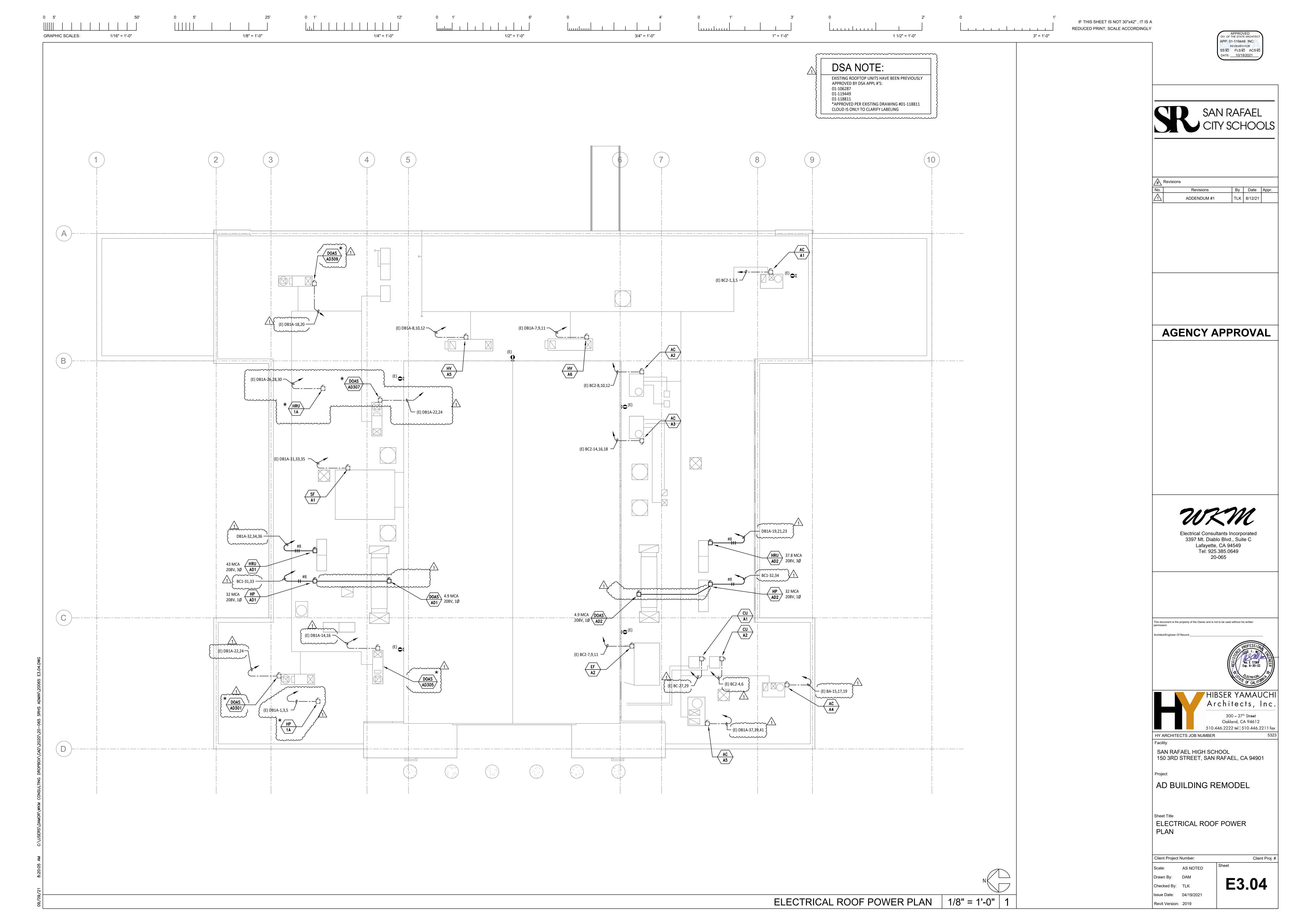


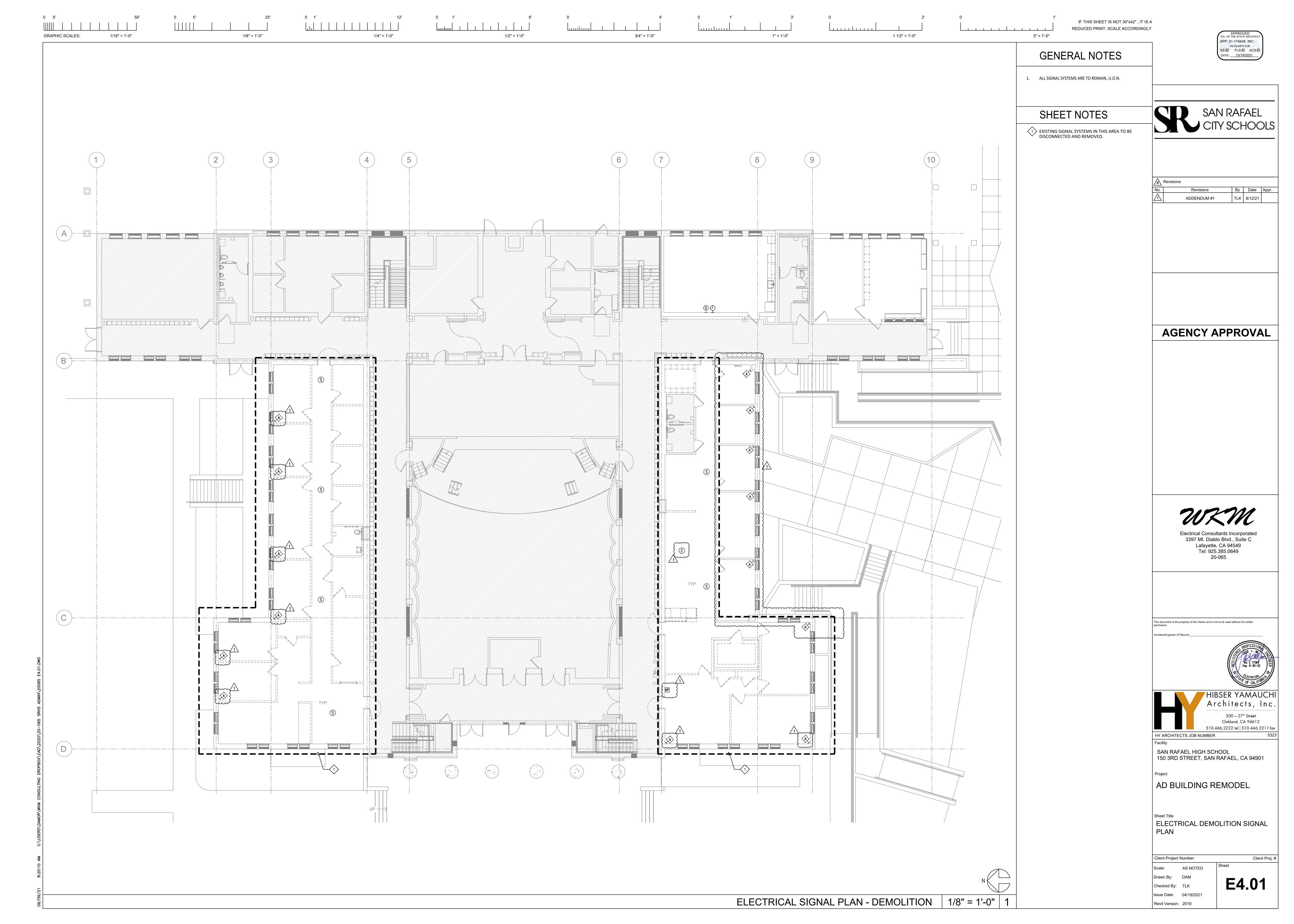


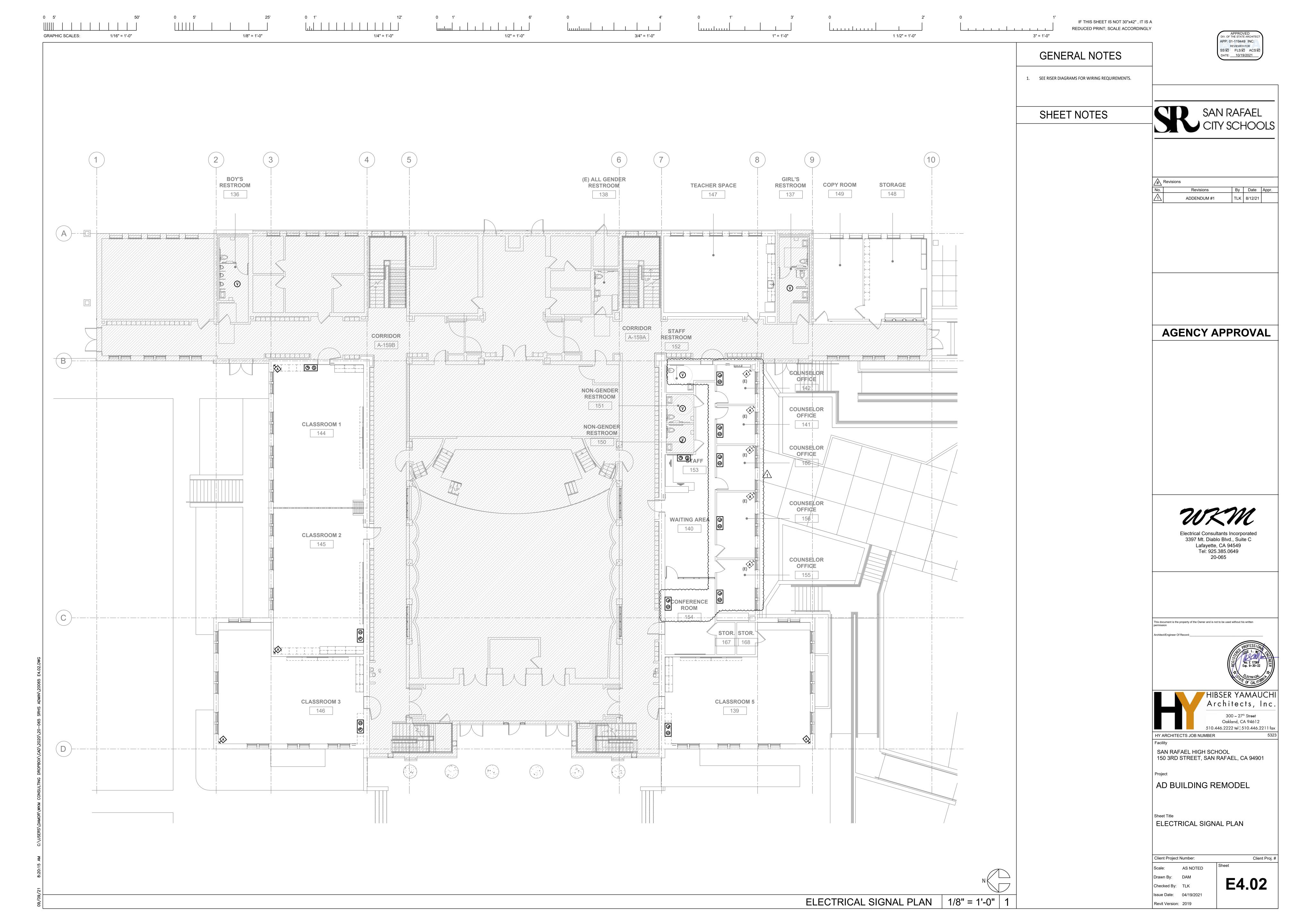


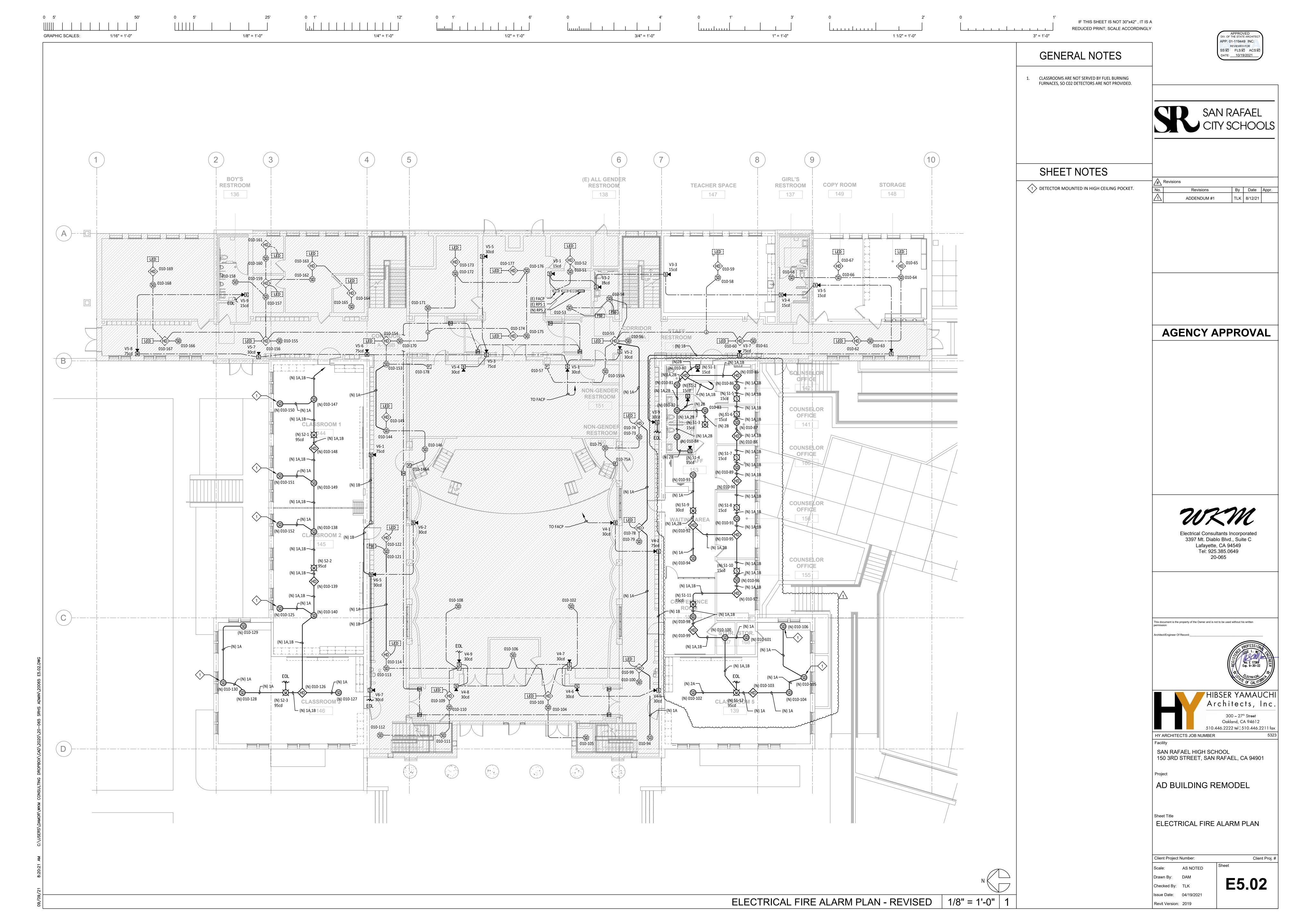












0.000000

| FIRE                 | ALARM O                            | PERATION                             | MATRIX                                    |                                             |                                                    |                               |                                                   |                                                                        |                                                                             |                                                                           |
|----------------------|------------------------------------|--------------------------------------|-------------------------------------------|---------------------------------------------|----------------------------------------------------|-------------------------------|---------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------|
| MAI OUTPUT           | ANNUNCIATE ALARM CONDITION AT FACP | ANNUNCIATE TROUBLE CONDITION AT FACP | ANNUNCIATE ALARM CONDITION AT ANNUNCIATOR | ANNUNCIATE TROUBLE CONDITION AT ANNUNCIATOR | ACTIVATE SPEAKER/STROBE UNITS<br>THROUGHOUT CAMPUS | ACTIVATE SPRINKLER RISER BELL | SHUTDOWN ASSOCIATED AHU AND FIRE<br>SMOKE DAMPERS | ACTIVATE ALARM SIGNAL FOR CENTRAL<br>STATION (SIGNAL VIA DRY CONTACTS) | ACTIVATE TROUBLE SIGNAL FOR<br>CENTRAL STATION (SIGNAL VIA DRY<br>CONTACTS) | ANNUNCIATE SUPERVISORY AT PANEL<br>AND ANNUNCIATOR AND CENTRAL<br>STATION |
| MANUAL STATION       | X                                  |                                      | X                                         |                                             | X                                                  |                               |                                                   | X                                                                      |                                                                             |                                                                           |
| HEAT/SMOKE DETECTORS | X                                  |                                      | X                                         |                                             | X                                                  |                               | X                                                 | X                                                                      |                                                                             |                                                                           |
| DUCT DETECTORS       |                                    | X                                    |                                           | X                                           |                                                    |                               | X                                                 | X                                                                      |                                                                             |                                                                           |
| WATER FLOW           | X                                  |                                      | X                                         |                                             | X                                                  | X                             | X                                                 | X                                                                      |                                                                             |                                                                           |
| TAMPER / PIV         |                                    | X                                    |                                           | X                                           |                                                    |                               |                                                   | _                                                                      | X                                                                           | X                                                                         |
| SYSTEM TROUBLE       |                                    | X                                    |                                           | X                                           |                                                    |                               |                                                   |                                                                        | X                                                                           |                                                                           |

## EXISTING FIRE ALARM CONTROL PANEL BATTERY CALCULATIONS

| PANEL MODULES |                              |          |          |          |          |  |  |  |
|---------------|------------------------------|----------|----------|----------|----------|--|--|--|
| QTY           | DESCRIPTION                  | STAI     | NDBY     | ALARM    |          |  |  |  |
|               |                              | EACH     | TOTAL    | EACH     | TOTAL    |  |  |  |
| 1             | (E) MAIN CONTROL BOARD       | 0.175000 | 0.175000 | 0.175000 | 0.175000 |  |  |  |
| 2             | (E) ALD LOOP                 | 0.066000 | 0.132000 | 0.066000 | 0.132000 |  |  |  |
| 2             | (E) NAC CIRCUIT              | 0.012000 | 0.024000 | 0.012000 | 0.024000 |  |  |  |
| 1             | (E) ANNUNCIATOR KEYBOARD     | 0.005000 | 0.005000 | 0.005000 | 0.005000 |  |  |  |
| 3             | (E) NETWORK INTERFACE MODULE | 0.070000 | 0.210000 | 0.070000 | 0.210000 |  |  |  |
|               |                              |          |          |          |          |  |  |  |
|               | PANEL STANDBY CURRENT        |          | 0.546000 |          |          |  |  |  |
|               | PANEL ALARM CURRENT          |          |          |          | 0.546000 |  |  |  |

| FIELD DEVICES |                        |         |          |       |       |  |  |  |  |
|---------------|------------------------|---------|----------|-------|-------|--|--|--|--|
| QTY           | DESCRIPTION            | STANDBY |          | ALARM |       |  |  |  |  |
|               |                        | EACH    | TOTAL    | EACH  | TOTAL |  |  |  |  |
|               |                        |         |          |       |       |  |  |  |  |
|               |                        |         |          |       |       |  |  |  |  |
|               |                        |         |          |       |       |  |  |  |  |
|               |                        |         |          |       |       |  |  |  |  |
| · .           |                        |         |          |       |       |  |  |  |  |
| 1             | DEVICE STANDBY CURRENT |         | 0.000000 |       |       |  |  |  |  |

DEVICE ALARM CURRENT

| TOTAL SYST                        | EM CURRENT |             |
|-----------------------------------|------------|-------------|
| DESCRIPTION                       | STANDBY    | ALARM       |
| CONTROL PANEL                     | 0.546000   | 0.546000    |
| FIELD DEVICES                     | 0.000000   | 0.000000    |
| TOTAL STANDBY CURRENT             | 0.546000   |             |
| X 24 HOUR STANDBY                 | 13.104000  |             |
| TOTAL ALARM CURRENT               |            | 0.546000    |
| 5 MINUTES OF ALARM (X .083)       |            | 0.045318    |
| TOTAL BATTERY REQUIREMENT         |            | 13.149318   |
| TOTAL BAT. WITH 20% SAFETY MARGIN |            | 15.7792     |
| BATTERY SUPPLIED                  |            | * (2) 18 AH |

\* THE EXISTING ALD LOOPS INCLUDE CURRENT DRAW FOR MAXIMUM NUMBER OF INITIATION DEVICES. THEREFORE ADDITIONAL DEVICES ADDED IN THIS PROJECT DO NOT CHANGE THE EXISTING BATTERY REQUIREMENT.

## **NEW RPS BATTERY CALCULATIONS** PANEL MODULES

| QTY | DESCRIPTION           | STANDBY |        | ALARM  |        |  |
|-----|-----------------------|---------|--------|--------|--------|--|
|     |                       | EACH    | TOTAL  | EACH   | TOTAL  |  |
| 1   | SIEMENS PAD 3         | 0.0750  | 0.0750 | 0.0750 | 0.0750 |  |
|     |                       |         |        |        |        |  |
|     |                       |         |        |        |        |  |
|     |                       |         |        |        |        |  |
|     | PANEL STANDBY CURRENT |         | 0.0750 |        |        |  |
|     | PANEL ALARM CURRENT   |         |        |        | 0.0750 |  |

|          |                             | FIELD DEVI                       | CES    |        |        |        |
|----------|-----------------------------|----------------------------------|--------|--------|--------|--------|
|          | QTY DESCRIPTION STANDBY ALA |                                  |        | ARM    |        |        |
| 1        |                             |                                  | EACH   | TOTAL  | EACH   | TOTAL  |
| <u> </u> | 2                           | WALL STROBE (15CD)               | 0.0000 | 0.0000 | 0.0570 | 0.1140 |
| }        | 1                           | WALL MOUNT HORN/STROBE (15CD)    | 0.0000 | 0.0000 | 0.0820 | 0.2460 |
| }        | 6                           | CEILING MOUNT STROBE (15CD)      | 0.0000 | 0.0000 | 0.0570 | 0.8150 |
| }        | 1                           | CEILING MOUNT HORN/STROBE (15CD) | 0.0000 | 0.0000 | 0.0820 | 0.8150 |
| }        | 1                           | CEILING MOUNT HORN/STROBE (30CD) | 0.0000 | 0.0000 | 0.1020 | 0.8150 |
| }        | 4                           | CEILING MOUNT HORN/STROBE (95CD) | 0.0000 | 0.0000 | 0.1630 | 0.8150 |
| {        |                             | DEVICE STANDBY CURRENT           |        | 0.0000 |        |        |
| {        |                             | DEVICE ALARM CURRENT             |        |        |        | 3.6200 |

| TOTAL SYSTEM CURRENT                 |         |   |         |  |  |  |  |  |
|--------------------------------------|---------|---|---------|--|--|--|--|--|
| DESCRIPTION                          | STANDBY |   | ALARM   |  |  |  |  |  |
| CONTROL PANEL                        | 0.0750  |   | 0.0750  |  |  |  |  |  |
| FIELD DEVICES                        | 0.0000  |   | 3.6200  |  |  |  |  |  |
| TOTAL STANDBY CURRENT                | 0.0750  |   |         |  |  |  |  |  |
| X 24 HOUR STANDBY                    | 1.8000  |   | ~       |  |  |  |  |  |
| TOTAL ALARM CURRENT                  | ·       |   | 3.6950  |  |  |  |  |  |
| 5 MINUTES OF ALARM (X .083)          |         |   | 0.3067  |  |  |  |  |  |
| TOTAL BATTERY REQUIREMENT            |         |   | 2.1067  |  |  |  |  |  |
| TOTAL BATTERY WITH 20% SAFETY MARGIN |         | ( | 2.5280  |  |  |  |  |  |
| BATTERY SUPPLIED                     |         | { | (2) 7AH |  |  |  |  |  |

## SCOPE OF WORK

IF THIS SHEET IS NOT 30"x42", IT IS A REDUCED PRINT; SCALE ACCORDINGLY

1. DISCONNECT AND REMOVE EXISTING FIRE ALARM DEVICES AND PROVIDE AND INSTALL NEW FIRE ALARM DEVICES AS SHOWN ON PLANS FOR REMODEL AREA AND CONNECT TO EXISTING SIEMENS SYSTEM.

## TYPE OF SYSTEM

-THIS IS AN EXISTING AUTOMATIC ADDRESSABLE SYSTEM. -CLASS 'B' DETECTION.

-SYSTEM IS A PROTECTED PREMISIS AND REQUIRES 24 HOUR STANDBY. -THE SUPERVISING STATION SHALL BE LISTED AS EITHER UUFX OR INITIATING DEVICES FOR AREA OF WORK SHALL BE AUTOMATIC TYPE AS REQUIRED BY FIRE PROTECTION ACT (SB575) GREEN OAKS FAMILY

ACADEMY MIDDLE SCHOOL. - BUILDINGS ARE TYPE 'E' OCCUPANCY.

FROM FIRE ALARM

INITIATION DEVICE

PANEL OR PREVIOUS

PANEL OR PREVIOUS INITIATION DEVICE

FROM FIRE ALARM

FROM FIRE ALARM PANEL OR PREVIOUS

PANEL OR PREVIOUS

PANEL OR PREVIOUS SIGNALING DEVICE

VOLTAGE DROP (VD) CALCULATION

100 10 15 10 45 10

VOLT. DROP @ DEV. 0.30101 0.02739 0.03825 0.02279 0.09407 0.01902 0.01713 0.02287 0.03341 0.04495

VOLTAGE DROP (VD) CALCULATION

4th

PROJECT NAME:

12 12 12

200 60 60

0.163 0.163 0.163

SIGNAL CIRCUIT #:

PROJECT NAME:

45 50

0.082 0.163

0.91 AMPS

3.4%

TOTAL AMPS@DEV. 0.489 0.326 0.163

VOLT. DROP @ DEV. 0.3235 0.0647 0.03235

**DEVICE #** 

DEVICE #

**GAUGE WIRE** 

DISTANCE (FT)

AMPS OF DEVICE

TOTAL CKT. AMPS

CKT VOLTAGE =

% VOLTAGE DROP=

**DEVICE #** 

**GAUGE WIRE** 

**DEVICE #** 

**GAUGE WIRE** 

DISTANCE (FT)

AMPS OF DEVICE TOTAL AMPS@DEV.

VOLT. DROP @ DEV.

CKT VOLTAGE =

TOTAL CKT. AMPS 0.489 AMPS

TOTAL CKT V DROP = 0.4206 VDC

% VOLTAGE DROP= 2.1%

DISTANCE (FT)

AMPS OF DEVICE

TOTAL AMPS@DEV. 0.245 0.163

VOLT. DROP @ DEV. 0.03647 0.02696

TOTAL CKT V DROP = 0.6843 VDC

**GAUGE WIRE** 

DISTANCE (FT)

AMPS OF DEVICE

TOTAL AMPS@DEV.

SIGNAL CIRCUIT #: S1

SIGNALING DEVICE

PANEL OR PREVIOUS

INITIATION DEVICE =

TYPICAL FIRE ALARM DEVICE ELEVATIONS | NTS | 1

TYPICAL CONTROL/MONITOR MODULE/RELAY

FROM FIRE ALARM
PANEL OR PREVIOUS
INITIATION DEVICE

TO NEXT INITIATION
DEVICE

TYPICAL PULL STATION

FROM FIRE ALARM TO NEXT INITIATION

TYPICAL ADDRESSABLE HEAT DETECTOR

TYPICAL SMOKE DETECTOR

TYPICAL STROBE LIGHT

FROM FIRE ALARM TO NEXT SIGNALING

TYPICAL SPEAKER

FROM FIRE ALARM — O TO NEXT SIGNALING

TYPICAL SPEAKER/STROBE

FROM FIRE ALARM
PANEL OR PREVIOUS
SIGNALING DEVICE
TO NEXT SIGNALING
DEVICE OR END-OF-LINE
RESISTOR

TYPICAL FIRE ALARM DEVICE DETAIL NTS 2

SAN RAFAEL HS

0.082 0.057 0.082 0.057 0.057 0.057 0.057 0.057 0.102 0.057

0.91 0.828 0.771 0.689 0.632 0.575 0.518 0.461 0.404 0.302

12 12 12 12 12 12 12 12 12

0 0 0 0 0 0 0

\*\* FORMULA \*\*

I \* FEET \* 21.6

12 12 12

\*\* FORMULA \*\*

I \* FEET \* 21.6

C.M.

\_\_\_\_\_

12th 13th 14th 15th 16th 17th 18th

WIRE RESIS. CIRC.

SIZE /M FT. MILS.

10 1.24 10380

12 1.59 6530

14 2.52 4110

16 4.02 2580 18 6.39 1620

20 10.1 1020

SAN RAFAEL HS

12 12 12 12

11th 12th 13th 14th 15th 16th 17th 18th 19th 20th

0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0

WIRE RESIS. CIRC. SIZE /M FT. MILS.

10 1.24 10380

12 1.59 6530

14 2.52 4110

16 4.02 2580

18 6.39 1620

20 10.1 1020

12 12 12 12 12 12 12 12 12 12

0 0 0 0 0

5th

SIGNALING DEVICE

DEVICE OR RESISTOR

TO NEXT SIGNALING

DEVICE OR END-OF-LINE

TO MONITORED/CONTROLLED INITIATION DEVICE

TO NEXT INITIATION

DEVICE OR END-OF-LINE

12 12

TO NEXT

INITIATION DEVICE

- SYSTEM DESIGNER: TIFFANY L. KANE, WKM ELECTRICAL CONSULTANTS, INC

# APPLICABLE CODES

PARTIAL LIST OF APPLICABLE CODES AS OF JANUARY 1, 2020: 2019 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 CCR 2019 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR (2018 INTERNATIONAL BUILDING CODE, VOL. 1 & 2, AND 2019 CALIFORNIA 2019 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR (2017 NATIONAL ELECTRICAL CODE AND 2019 CALIFORNIA AMENDMENTS) 2019 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR (2018 IAPMO UNIFORM MECHANICAL CODE AND 2019 CALIFORNIA AMENDMENTS)

2019 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR (2018 IAPMO UNIFORM PLUMBING CODE AND 2019 CALIFORNIA AMENDMENTS) 2019 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24 CCR

2019 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR (2018 INTERNATIONAL FIRE CODE AND 2019 CALIFORNIA AMENDMENTS)

2019 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR (2018 INTERNATIONAL EXISTING BUILDING CODE AND 2019 2019 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR 2019 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR

TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS 2016 ASME A17.1/CSA B44-13 SAFETY CODE FOR ELEVATORS AND ESCALATORS (PER 2019 CBC PART 2 CH 35) NOTE: CAL/OSHA ELEVATOR UNIT ENFORCES CCR TITLE 8 AND USES THE 2004 ASME A17.1 BY ADOPTION

NFPA 13 - STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS (CA AMENDED) - 2016 EDITION NFPA 14 - STANDARD FOR THE INSTALLATION OF STANDPIPE AND HOSE SYSTEMS (CA AMENDED) - 2013 EDITION NFPA 17 - STANDARD FOR DRY CHEMICAL EXTINGUISHING SYSTEMS - 2016 EDITION NFPA 17A - STANDARD FOR WET CHEMICAL EXTINGUISHING SYSTEMS - 2017 EDITION NFPA 20 - STANDARD FOR THE INSTALLATION OF STATIONARY PUMPS FOR FIRE PROTECTION - 2017 EDITION NFPA 22 - STANDARD FOR WATER TANKS FOR PRIVATE FIRE PROTECTION - 2013 EDITION

NFPA 24 - STANDARD FOR THE INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES (CA AMENDED) - 2016 EDITION NFPA 72 - NATIONAL FIRE ALARM AND SIGNALING CODE (CA AMENDED) - 2016 EDITION NFPA 80 - STANDARD FOR FIRE DOORS AND OTHER OPENING PROTECTIVES - 2016 EDITION NFPA 2001 - STANDARD ON CLEAN AGENT FIRE EXTINGUISHING SYSTEMS (CA AMENDED) - 2015 EDITION UL 300 - STANDARD FOR FIRE TESTING OF FIRE EXTINGUISHING SYSTEMS FOR PROTECTION OF COMMERCIAL COOKING EQUIPMENT - 2005

UL 464 - AUDIBLE SIGNALING DEVICES FOR FIRE ALARM AND SIGNALING SYSTEMS, INCLUDING ACCESSORIES - 2003 EDITION UL 521 - STANDARD FOR HEAT DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS - 1999 EDITION UL 1971 - STANDARD FOR SIGNALING DEVICES FOR THE HEARING IMPAIRED - .2002 (R2010) ICC 300 - STANDARD FOR BLEACHERS, FOLDING AND TELESCOPIC SEATING, AND GRANDSTANDS - 2017 EDITION

FOR A COMPLETE LIST OF APPLICABLE NFPA STANDARDS REFER TO 2019 CBC (SFM) CHAPTER 35 AND CALIFORNIA FIRE CODE CHAPTER 80. SEE CALIFORNIA BUILDING CODE CHAPTER 35 FOR STATE OF CALIFORNIA AMENDMENTS TO THE NFPA STANDARDS AND AN OVERALL LISTING OF REFERENCED STANDARDS.

# FIRE ALARM SYSTEM NOTES

- 1. FINAL FIRE ALARM TEST SHALL BE MADE WITH THE DSA PROJECT INSPECTOR (PI). LOCAL FIRE AUTHORITY SHALL BE NOTIFIED OF DATE AND TIME OF FINAL FIRE ALARM TESTING AND SHALL ASSIST/ WITNESS SUCH TESTING WHEN ABLE.
- 2. UNDERGROUND AND EXTERIOR CONDUITS WILL HAVE WATER-TIGHT FITTINGS. (CEC 110-11 AND 300-6)
- 3. FIRE ALARM DEVICE MOUNTING HEIGHTS: - PULL STATION: 48" TO TOP OF HANDLE ABOVE FINISHED FLOOR. (CEC 380-8c) - HORN INTERIOR: MINIMUM 90" TO TOP OF DEVICE ABOVE FINISHED FLOOR, NOT LESS THAN 6" FROM CEILING. (2016 NFPA72-18.4.8.1) - WALL MOUNTED STROBE OR HORN/STROBE: MINIMUM 80" TO BOTTOM OF STROBE LENS AND NOT GREATER THAN 96" TO TOP OF STROBE LENS, ABOVE FINISHED FLOOR, NOT LESS THAN 6" FROM CEILING, (2016 NFPA72-18.5.4.1)
- 4. TO ENSURE THAT AUDIBLE PUBLIC MODE SIGNALS ARE CLEARLY HEARD, UNLESS OTHERWISE PERMITTED BY 2016 NFPA72-18.4.3.2 THROUGH 18.4.3.5, THEY SHALL HAVE A SOUND LEVEL AT LEAST 15db ABOVE THE AVERAGE AMBIENT SOUND LEVEL OR 5db ABOVE THE MAXIMUM SOUND LEVEL HAVING A DURATION OF AT LEAST 60 SECONDS, WHICHEVER IS GREATER, MEASURED 5 ft (1.5 m) ABOVE THE FLOOR IN THE AREA REQUIRED TO BE SERVED BY THE SYSTEM USING THE A-WEIGHTED SCALE (dBA). (2016 NFPA72-18.4.3.1)
- 5. AUDIBLE DEVICES SHALL SOUND THE CALIFORNIA UNIFORM FIRE ALARM SIGNAL IN TEMPORAL MODE. 6. VISUAL DEVICES SHALL NOT EXCEED 2 FLASHES PER SECOND AND SHALL NOT BE SLOWER THAN 1 FLASH EVERY SECOND. (2016 NFPA72-18.5.2.1)
- 7. FIRE ALARM CONTRACTOR SHALL PROVIDE A "RECORD OF COMPLETION" TO THE PROJECT INSPECTOR (PI) / DSA AFTER COMPLETION OF OPERATIONAL ACCEPTANCE TESTS. (2016 NFPA 72-14.6.2.4 AND FIGURE 14.6.2.4)
- 8. ALL CIRCUITS SHALL BE SUPERVISED AGAINST OPENS, SHORTS AND GROUNDS.
- 9. INSTALLATION OF DEVICES SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS
- 10. MARK ALL WIRES IN ACCORDANCE WITH 760-10.
- 11. ALL OUTSIDE FIRE ALARM DEVICES SHALL BE CSFM LISTED AS WEATHERPROOF TYPE
- 12. EXISTING CAMPUS FIRE ALARM SYSTEM SHALL NOT BE DISCONNECTED OR TAKEN OUT OF SERVICE WITHOUT WRITTEN PERMISSION FROM SCHOOL DISTRICT. 48 HOUR NOTICE SHALL PROVIDED TO LOCAL FIRE AUTHORITY PRIOR TO FIRE ALARM SYSTEM SHUTDOWN.
- 13. ALL FIRE ALARM WIRING SHALL BE CONTINUOUS WITHOUT SPLICES AND TERMINATED IN TERMINAL BLOCKS OF THE DEVICE OR FIRE ALARM APPROVED TERMINAL BLOCKS IN TERMINAL CABINETS OR
- 14. ALL FIRE ALARM WIRING INSTALLED IN UNDERGROUND CONDUIT OR OTHER WET LOCATIONS SHALL BE UL LISTED FOR WET LOCATIONS.
- 15. ALL WIRING TO BE RUN IN FIRE ALARM DEDICATED CONDUIT. ALL NEW FA WIRING SHALL BE INSTALLED IN CONDUIT MINIMUM SIZE 3/4" U.O.N. USE EXISTING FIRE ALARM CONDUITS WHERE PRACTICAL TO INSTALL A NEW FA WIRING. FIELD VERIFY EXACT EXISTING CONDUIT ROUTING.
- 16. ALL SHIELDS TO BE CONTINUOUS, DRY AND FREE FROM ALL GROUNDS AND SHORTS.
- 17. ELECTRICAL/FIRE ALARM CONTRACTOR SHALL VERIFY EXISTING AVAILABLE ADDRESSES ON EXISTING SYSTEM AND CORRECT ON AS-BUILT DRAWINGS FOR SUBMITTAL TO SCHOOL DISTRICT AT END OF PROJECT.
- 18. THIS CAMPUS HAS AN EXISTING UL LISTED CENTRAL MONITORING STATION: SUPERVISING STATION: AUTOMATIC FIRE ALARM SYSTEMS SHALL TRANSMIT THE ALARM, SUPERVISORY AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION AS REQUIRED BY NFPA 72, AS AMENDED BY CFC CHAPTER 80. THE SUPERVISION STATION SHALL BE LISTED AS EITHER UUFX OR UUJS BY UNDERWRITERS LABORATORY OR SHALL MEET THE REQUIREMENTS OF FACTORY MUTUAL RESEARCH APPROVAL STANDARD 3011.
- 19. THE DOCUMENTATION CABINET SHALL BE PROMINENTLY LABELED SYSTEM RECORD DOCUMENTS PER NFPA 72, 7.7.2.4.
- 20. AFTER APPROVAL, SUBSTITUTIONS OF FIRE ALARM MANUFACTURERS SHALL REQUIRE A CHANGE ORDER WITH MANUFACTURER CUT SHEETS AND APPLICABLE CSFM LISTINGS.
- 21. PER NFPA 72 10.6.5.2: -PROVIDE DEDICATED FIRE ALARM CIRCUIT.
- -BREAKER FOR CIRCUIT SHALL BE RED AND MECHANICAL LOCKOUT SHALL BE PROVIDED. -FIRE ALARM PANEL AND CIRCUIT NUMBER SHALL BE IDENTIFIED ON ALL FIRE ALARM PANELS. -ALL PANELS ARE ACCESSIBLE ONLY TO AUTHORIZED PERSONNEL, I.E. LOCKED CABINETS OR LOCKED ROOMS.

AGENCY APPROVAL

**ADDENDUM #1** 

APPROVED DIV. OF THE STATE ARCHITEC

APP: 01-119449 INC: REVIEWED FOR SS FLS ACS

DATE: 10/19/2021

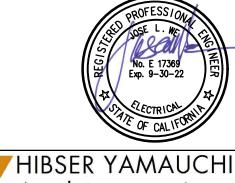
TLK 8/12/21



20-065

This document is the property of the Owner and is not to be used without his written

rchitect/Engineer Of Record:



Architects, Inc. 300 – 27<sup>th</sup> Street Oakland, CA 94612 510.446.2222 tel ; 510.446.2211 fax

HY ARCHITECTS JOB NUMBER

SAN RAFAEL HIGH SCHOOL 150 3RD STREET, SAN RAFAEL, CA 94901

AD BUILDING REMODEL

ELECTRICAL FIRE ALARM NOTES. **DETAILS AND SCHEDULES** 

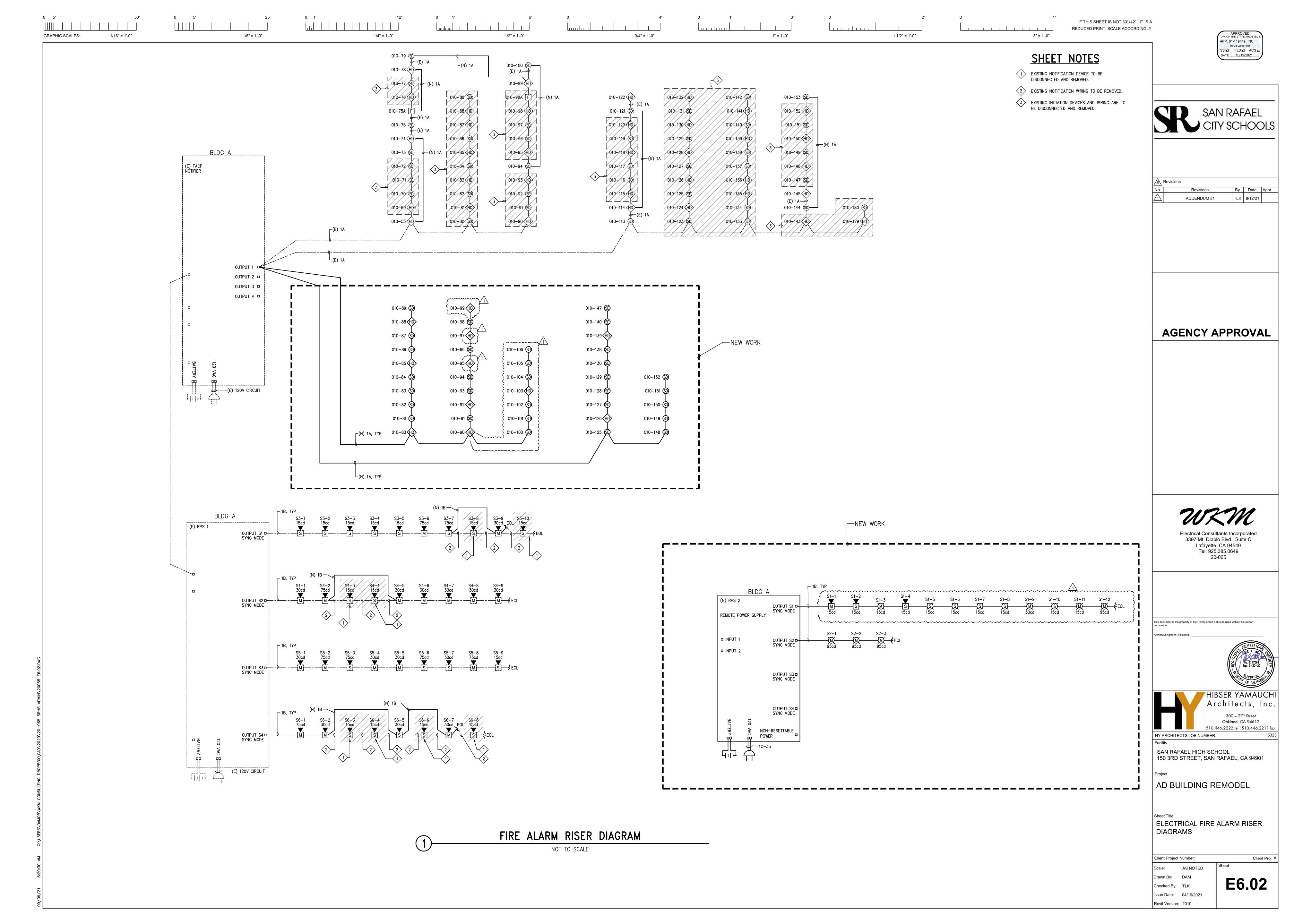
AS NOTED

Client Proj. #

E6.01 Revit Version: 2019

Client Project Number:

Drawn By: DAM Checked By: TLK Issue Date: 04/19/2021



## SECTION 06 06 60 PLASTIC FABRICATIONS

### PART 1 - GENERAL

### 1. RELATED DOCUMENTS

 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to this Section.

#### 2. SUMMARY

- a. This Section includes the Plastic Fabrication as shown and specified in the described system(s):
  - 1) Storefront system panel inserts
- b. Related Sections include the following:
  - 1) Section 08 80 00 Glazing
  - 2) Section 08 41 13 Aluminum Entrances and Storefronts

## 3. SUBMITTALS

- a. General: Submit the following in accordance with conditions of contact and Division 1 specification section 01 33 00 "Submittal Procedures".
- Product Data: Submit manufacturer's product data; include product description, fabrication information, and compliance with specified performance requirements.
- c. Shop Drawings: Include plans, elevations, sections, panel dimensions, details, and attachments to other work.
- d. Samples for Initial Selection:
  - 1) Submit minimum 6-inch by 6-inch samples. Indicate full color, texture and pattern variation.
- e. Samples for Verification:
  - 1) Submit minimum 6-inch by 6-inch sample for each type, texture, pattern and color of solid plastic fabrication.
- f. Maintenance Data: Submit manufacturer's care and maintenance data, including care, repair and cleaning instructions. Include in Project closeout documents.

#### 4. QUALITY ASSURANCE

a. Manufacturer's Qualifications

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- 1) Materials and systems shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least five (5) consecutive years and which can show evidence of those materials being satisfactorily used on at least six (6) projects of similar size, scope and location. At least three (3) of the projects shall have been successful for use five (5) years or longer.
- Manufactured panels must be produced from a minimum of 40% preconsumer recycle content. This recycle content must be certified by a recognized 3<sup>rd</sup> party certification group, such as Scientific Certification Systems (SCS).
- 3) Completely PVC Free product

## 5. DELIVERY, STORAGE, AND HANDLING

- a. Deliver Plastic Fabrications, systems and specified items in manufacturer's standard protective packaging.
- b. Do not deliver Plastic Fabrications, system, components and accessories to Project site until areas are ready for installation.
- c. Store materials in a flat orientation in a dry place that is not exposed to exterior elements.
- d. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent damage or staining following installation for duration of project.
- e. Before installing Plastic Fabrications, permit them to reach room temperature.

## 6. PROJECT CONDITIONS

a. Environmental Limitations: Do not install Solid Polymer Fabrications until spaces are enclosed and weatherproof, and ambient temperatures and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

## 7. WARRANTY

- a. Manufacturer's Special Warranty on Plastic Fabrications: Manufacturer's standard form agreeing to repair or replace units that fail in material or workmanship within the specified warranty period.
- b. Warranty Period: 1 year after the date of substantial completion.
- c. The warranty shall not deprive the owner of other rights or remedies the Owner may have under other provisions of the Contract Documents, and is in addition to and runs concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

#### PART 2 - PRODUCTS

1. MANUFACTURER

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a. Manufacturer: 3form, LLC., Salt Lake City, Utah, USA / telephone 801-649-2500

## 2. MATERIALS

- a. Varia Ecoresin™ Sheet
  - 1) Engineered co-polyester resin produced in the USA
  - 2) Sheet Size: Maximum 4' x 10'
  - 3) Thickness: 1/2"
  - 4) Basis of Design Product: The design of Plastic Fabrications is based on Varia Ecoresin™ as provided by 3form, LLC. Products from other manufacturers must be approved by the Architect or Designer prior to bidding in accordance with the Instructions to Bidders and Section 10 60 00 "Product Requirements".
- b. Interlayer Materials: Compatible with polyesters and bonding process to create a monolithic sheet of material when complete.

## 3. FABRICATION

- General: Fabricate Plastic Fabrications to designs, sizes and thicknesses indicated and to comply with indicated standards. Sizes, profiles and other characteristics are indicated on the drawings.
- b. Comply with manufacturer's written recommendations for fabrication.
- c. Machining: Acceptable means of machining are listed below. Ensure that material is not chipped or warped by machining operations.
  - 1) Sawing: Select equipment and blades suitable for type of cut required.
  - 2) Drilling: Drills specifically designed for use with plastic products.
  - 3) Milling: Climb cut where possible.
  - 4) Routing
  - 5) Tapping
- d. Forming: Form products to shapes indicated using the appropriate method listed below. Comply with manufacturer's written instructions.
  - 1) Cold Bending
  - 2) Hot Bending
  - 3) Thermoforming: Acceptable only on uncoated material.
  - 4) Drape Forming
  - 5) Matched Mold Forming
  - 6) Mechanical Forming
- e. Laminating: Laminate to substrates indicated using adhesives and techniques recommended by manufacturer.

### 4. MISCELLANEOUS MATERIALS

 General: Provide products of material, size, and shape required for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

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- b. Cleaner: Type recommended by manufacturer.
- c. Fasteners: Use screws designed specifically for plastics. Self-threading screws are acceptable for permanent installations. Provide threaded metal inserts for applications requiring frequent disassembly such as light fixtures.
- d. Bonding Cements: May be achieved with solvents or adhesives, suitable for use with product and application.

### PART 3 - EXECUTION

## 1. EXAMINATION

a. Examine substrates, areas, and conditions where installation of Plastic Fabrications will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for installation and comply with requirements specified.

#### 2. INSTALLATION

- a. General: Comply with manufacturer's written instructions for the installation of Plastic Fabrications.
- b. Manufacturer's shop to fabricate items to the greatest degree possible.
- c. Utilize fasteners, adhesives and bonding agents recommended by manufacturer for type of installation indicated. Material that is chipped, warped, hazed or discolored as a result of installation or fabrication methods will be rejected.
- d. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
- e. Form field joints using manufacturer's recommended procedures. Locate seams in panels so that they are not directly in line with seams in substrates.
- f. We recommend that installation is completed by a 3form Certified Installer. Contact 3form for more information or to get a quote.

## 3. CLEANING AND PROTECTION

a. Protect surfaces from damage until date of substantial completion. Repair work or replace damaged work, which cannot be repaired to Architect's satisfaction.

#### **END OF SECTION**

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## SECTION 08 41 00 ALUMINUM ENTRANCES AND STOREFRONTS

## **PART 1 - GENERAL**

### 1.1 SECTION INCLUDES

- A. Aluminum doors, frames and glazed lights.
- B. Anchors, brackets, and attachments.
- C. Perimeter sealant.

## 1.2 REFERENCES (USE DATE OF STANDARD IN EFFECT AS OF BID DATE)

Contractor's work shall comply with the following standards as applicable. Manufactured items are to be fabricated to these same standards.

The following standards (and publications) are applicable to the extent referenced in the text. The most recent of these standards is implied, unless otherwise stated.

- A. ASTM A36 Structural Steel.
- B. ASTM B221 Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.
- C. ASTM E283 Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors.
- D. ASTM D2000 Classification System for Rubber Products.
- E. ASTM D2287 Nonrigid Vinyl Chloride Polymer and Copolymer molding and Extrusion Compounds.
- F. AAMA 701.2 Voluntary Specification for Pile Weatherstripping.
- G. AAMA SFM-1 Aluminum Storefront and Entrance Manual.
- H. NAAMM Metal Finishes Manual.
- I. CBC 2019 California Building Code.

## 1.3 PERFORMANCE

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- A. System to provide for expansion and contraction within system components caused by a cycling temperature range of 120 F degrees without causing detrimental effects to system or components.
- B. Design and size members to withstand dead loads and live loads caused by pressure and suction of wind as calculated in accordance with CBC.
- C. Limit mullion deflection to 1/200, or flexure limit of glass with full recovery of glazing materials, whichever is less.
- D. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior.
- E. Limit air infiltration through assembly to 0.06 cu ft/min/sq ft as measured in accordance with ASTM E283.
- F. System to accommodate, without damage to system or components, or deterioration of perimeter seal: Movement within system; movement between system and perimeter framing components; dynamic loading and release of loads; and deflection of structural support framing.

#### 1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00, Submittals.
- B. Shop Drawings: Include system and component dimensions; components within assembly; framed opening requirements and tolerances; anchorage and fasteners; glass and infills; sub sill-pans under storefront units, door hardware requirements; and affected related Work.
- C. Product Data: Manufacturer's brochures and manufacturer's installation instructions.

## 1.5 QUALITY ASSURANCE

A. Perform Work in accordance with AMA SFM-1.

## 1.7 PRE-INSTALLATION CONFERENCE

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- A. Convene a preinstallation conference approximately two (2) weeks before scheduled commencement of storefront system installation and associated work.
- B. Require attendance of installer of each component of associated work, installers of substrate construction to receive window system, and other work in and around window installation which must precede or follow installation work (including cement plaster, fiber cement siding, and finish carpentry work if any), Architect, Owner, window system manufacturer's representative, and other representatives directly concerned with performance of the Work, including (where applicable) the IOR, Owner's insurers, testing agencies and governing authorities.

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- C. Objectives of conference to include:
  - 1. Review foreseeable methods and procedures related to window installation work, including set up and mobilization areas for stored material and work area.
  - 2. Tour representative areas of the Work, inspect and discuss condition of substrate, curbs, rough openings and other preparatory work performed by others.
  - 3. Review window system requirements (drawings, specifications and other contract documents).
  - 4. Review required submittals both completed and yet to be completed.
  - Review and finalize construction schedule related to the window installation work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
  - 6. Review required inspection, testing, certifying and material usage accounting procedures.
  - 7. Record discussion of conference including decisions and agreements (or disagreements) reached. Furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference. The Owner's Representative will designate one of the conference participants to record the proceedings and promptly distribute them to the participants for record.
  - 8. Review notification procedures for inclement weather or non-working days.
- D. The intent of the conference is to resolve issues affecting the installation and performance of the window installation work. Do not proceed with the installation work until such issues are resolved the satisfaction of the Owner and Engineer of Record. This shall not be construed as interference with the progress of Work on the part of the Owner or Engineer of Record.

### 1.8 WARRANTY

- A. The window manufacturer shall furnish a written warranty against defects in workmanship and materials for a period of ten (10) years from the date of Substantial Completion. Warranty shall stipulate that service to windows shall be performed on job site and not at a point of manufacture. Warranty shall cover all portions and components of the system, including the laminated glass.
- B. Manufacturer shall designate the factory certified installer as responsible to be on call for a period of five (5) years following the date of Project Closeout. During such time, all calls shall be responded to within eight (8) hours of notification by the District. On call shall include any repairs required for the system and caulking, as well as training and assistance to District staff as needed.

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C. Following the five-year period and for the remainder of the ten- year warranty period, the manufacturer shall be on call to correct all defects in manufacture. If such corrections involve need for the designated factory-certified installer, then installer shall be included as well.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle system components under provisions of Section 01 66 00 Product Delivery, Storage, and Handling.
- B. Provide strippable coating to protect prefinished aluminum surfaces.

## **PART 2 - PRODUCTS**

## 2.1 ACCEPTABLE MANUFACTURERS

- A. Arcadia, (213) 269-7300.
- B. EFCO Corporation, (800) 221-4169.
- C. Kawneer Company, Inc., (714) 523-4850.
- D. Or approved equal. Substitutions under the provisions of Section 01 25 13, Product Options and Substitutions.

## 2.2 MATERIALS

- A. Extruded Aluminum: ASTM B221; Alloy G.S. 10A-T5.
- B. Brackets and Reinforcements: High strength aluminum.
- C. Fasteners: Stainless steel, aluminum.
- D. Compression Weatherstripping: Replaceable gaskets of molded neoprene complying with ASTM D2000, or molded PVC complying with ASTM D 2287.
- E. Sliding Weatherstripping: Replaceable wool, polypropylene or nylon woven pile; nylon fabric or aluminum strip backing; complying with AAMA 701.2.

#### 2.3 FABRICATED COMPONENTS

- A. Frames: 2 inch x 4 inch profile, flush glazing stops.
- B. Wide Stile Doors: 2 inches thick, 5 inch wide top and mid-rail, 5 inch wide vertical stiles, 11 inch wide bottom rail (nominal dimensions); beveled glazing strips. All stiles and rails welded.
- C. Reinforced Mullion: Extruded aluminum cladding with internal reinforcement of steel

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shaped structural section as required by manufacturer.

E. Provide sill-pans per drawings under glazed units on curbs, as specified in Section 07 62 00, Flashing and Sheet Metal.

## 2.4 GLASS AND GLAZING MATERIALS

A. Plastic and Glass Glazing Materials: As specified in Sections 06 06 60 and 08 80 00 and as indicated on Drawings.

#### 2.5 HARDWARE

A. Door Hardware: As specified in Section 08 71 00, Door Hardware.

#### 2.6 FABRICATION

- A. Fabricate doors and frames allowing for minimum clearances and shim spacing around perimeter of assembly, yet enabling installation.
- B. Rigidly fit and secure joints and corners with internal reinforcement. Weld top and bottom rails of doors to reinforcement clips. Make joints and connections flush, hairline, and weatherproof.
- C. Develop drainage holes with moisture pattern to exterior.
- D. Prepare components to receive anchor devices. Fabricate anchorage items.
- E. Arrange fasteners, attachments, and jointing to ensure concealment from view.
- F. Prepare components with internal reinforcement for door hardware and door operator hinge hardware.
- G. Reinforce framing members for imposed loads.

## 2.7 FINISHES

- A. Anodized Finish: NAAMM AA-M12-C22, Class I clear anodic coating.
- B. Apply bituminous paint to separate dissimilar metals and metal surfaces in contact with cementitious or dissimilar materials.

## 2.8 SEALANT MATERIALS

A. Sealant and Backing Materials: As specified in Section 07 92 00, Joint Sealers.

## **PART 3 - EXECUTION**

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### 3.1 INSPECTION

- A. Verify wall openings and adjoining materials are ready to receive Work of this Section.
- B. Confirm that site conditions and substrates are ready for work covered under this section to commence. If not, Contractor is to make suitable repairs or adjustments to the work.
- B. Beginning of installation means acceptance of existing conditions.

### 3.2 INSTALLATION

- A. Install doors, frames, glazing and hardware in accordance with manufacturer's instructions and AAMA SFM-1.
- B. Use anchorage devices to securely attach frame assembly to structure.
- C. Attach to structure to permit adjustment to accommodate construction tolerances and other irregularities.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent Work.
- E. Install sill flashings.
- F. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- G. Install sealant and backing materials as specified in Section 07 90 00.
- H. Install hardware using templates provided. Refer to Section 08 71 00 for installation requirements.
- I. Install plastic or glass in accordance with Sections 06 06 60 and 08 80 00, using exterior dry method of glazing.
- J. Adjust operating hardware.

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K. Extra stock: Hardware (all labeled), weather stripping, glazing accessories as verified by Owner.

## 3.3 TOLERANCES

- A. Variation from Plane: 0.03 inches per foot maximum or 0.25 inches per 30 feet, whichever is less.
- B. Misalignment of Two Adjoining Members Abutting in Plane: 0.015 inches maximum.

## 3.4 CLEANING

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- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

**END OF SECTION** 

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## SECTION 08 71 00 DOOR HARDWARE

### PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A.Drawings and general provisions of Contract, including General and Supplementary Conditions of Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following, but is not necessarily limited to:
  - 1. Door Hardware, including electric hardware.
  - 2. Storefront and Entrance door hardware.
  - Gate Hardware.
  - 4. Digital keypad access control devices.
  - 5. Hold-open closers with smoke detectors.
  - 6. Wall or floor-mounted electromagnetic hold-open devices.
  - 7. Power supplies for electric hardware.
  - 8. Low-energy door operators plus sensors and actuators.
  - 9. Thresholds, gasketing and weather-stripping.
  - 10. Door silencers or mutes.
- C. Related Sections: The following sections are noted as containing requirements that relate to this Section, but may not be limited to this listing.
  - 1. Division 8: Section Steel Doors and Frames.
  - 2. Division 8: Section Wood Doors.
  - 3. Division 8: Section Aluminum Storefront
  - 4. Division 28: Section Fire/Life-Safety Systems & Security Access Systems.
- 1.3 REFERENCES (USE DATE OF STANDARD IN EFFECT AS OF BID DATE.)
  - A.2019 California Building Code, CCR, Title 24.
  - B.BHMA Builders' Hardware Manufacturers Association
  - C. CCR California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.

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- D. DHI Door and Hardware Institute
- E.NFPA National Fire Protection Association.
  - 1. NFPA 80 Fire Doors and Other Opening Protectives
  - 2. NFPA 105 Smoke and Draft Control Door Assemblies
- F.UL Underwriters Laboratories.
  - 1. UL 10C Fire Tests of Door Assemblies
  - 2. UL 305 Panic Hardware
- G. WHI Warnock Hersey Incorporated
- H. SDI Steel Door Institute

## 1.4 SUBMITTALS & SUBSTITUTIONS

- A.General: Submit in accordance with Conditions of the Contract and Division 1 Specification sections.
- B.Submit product data (catalog cuts) including manufacturers' technical product information for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Submit six (6) copies of schedule organized vertically into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
  - 1. Include a Cover Sheet with;
    - a. Job Name, location, telephone number.
    - b. Architects name, location and telephone number.
    - c. Contractors name, location, telephone number and job number.
    - d. Suppliers name, location, telephone number and job number.
    - e. Hardware consultant's name, location and telephone number.
  - 2. Job Index information included:
    - a. Numerical door number index including; door number, hardware heading number and page number.
    - b. Complete keying information (referred to DHI hand-book "Keying Systems and Nomenclature"). Provision should be made in the

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- schedule to provide keying information when available; if it is not available at the time the preliminary schedule is submitted.
- c. Manufacturers' names and abbreviations for all materials.
- d. Explanation of abbreviations, symbols, and codes used in the schedule.
- e. Mounting locations for hardware.
- f. Clarification statements or questions.
- g. Catalog cuts and manufacturer's technical data and instructions.
- 3. Vertical schedule format sample:

| Head     | ding Nu | mber 1 | (Hardware group or set number – HW -1)               |            |         |
|----------|---------|--------|------------------------------------------------------|------------|---------|
|          |         |        | (a) 1 Single Door #1 - Exterior from Corridor 101    | (b) 90°    | (c) RH  |
|          |         |        | (d) 3' 0"x7' 0" x 1-3/4" x (e) 20 Minute (f) WD x HM |            |         |
| (g)<br>1 | (h)     | (i) ea | (j) Hinges - (k) 5BB1HW 4.5 x 4.5 NRP (l) ½ TMS      | (m)<br>626 | (n) IVE |
| 2        | 6AA     | 1 ea   | Lockset - ND50PD x RHO x RH x 10-025 x JTMS          | 626        | SCH     |

- (a) Single or pair with opening number and location. (b) Degree of opening (c) Hand of door(s) (d) Door and frame dimensions and door thickness. (e) Label requirements if any. (f) Door by frame material. (g) (Optional) Hardware item line #. (h) Keyset Symbol. (i) Quantity. (j) Product description. (k) Product Number. (l) Fastenings and other pertinent information. (m) Hardware finish codes per ANSI A156.18. (n) Manufacture abbreviation.
- D. Make substitution requests in accordance with Division 1. Substitution requests must be made prior to bid date. Include product data and indicate benefit to the project. Furnish samples of any proposed substitution.
- E.Wiring Diagrams: Provide product data and wiring and riser diagrams for all electrical products listed in the Hardware Schedule portion of this section.
- F. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- G. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm

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- that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- H. Furnish as-built/as-installed schedule with close-out documents, including keying schedule and transcript, wiring/riser diagrams, manufacturers' installation and adjustment and maintenance information.
- I. Fire Door Assembly Testing: Submit a written record of each fire door assembly to the Owner to be made available to the Authority Having Jurisdiction (AHJ) for future building inspections.
- J. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

## 1.5 QUALITY ASSURANCE

- A.Obtain each type of hardware (latch and lock sets, hinges, closers, exit devices, etc.) from a single manufacturer.
- B.Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the project's vicinity, that has a record of successful inservice performance for supplying door hardware similar in quantity, type, and quality to that indicated for this project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
  - 1. Responsible for detailing, scheduling and ordering of finish hardware.
  - 2. Meet with Owner to finalize keying requirements and to obtain final instructions in writing.

To maintain the integrity of patented key systems provide a letter of authorization from the specified manufacturer indicating that supplier has authorization to purchase the key system directly from the manufacturer.

- 3. Stock parts for products supplied and are capable of repairing and replacing hardware items found defective within warranty periods.
- C. Hardware Installer: Company specializing in the installation of commercial door hardware with five years documented experience.
- D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not.
  - 1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be

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Equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".

E.Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A.Coordinate delivery of packaged hardware items to the appropriate locations (shop or field) for installation.
- B.Hardware items shall be individually packaged in manufacturers' original containers, complete with proper fasteners. Clearly mark packages on outside to indicate contents and locations in hardware schedule and in work.
- C. Provide locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, etc.
- D. Contractor to inventory door hardware jointly with representatives of hardware supplier and hardware installer until each all are satisfied that count is correct.
- E.Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- F. Product packaging to be labelled in compliance with CA Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986.

## 1.7 WARRANTY

- A. Provide warranties of respective manufacturers' regular terms of sale from day of final acceptance as follows:
  - 1. Locksets: "ND" Ten (10) years.
  - 2. Electronic: One (1) year.
  - 3. Closers: Thirty (30) years.
  - 4. Exit devices: Three (3) years.
  - 5. All other hardware: Two (2) years.

### 1.8 MAINTENANCE

A.Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

#### 1.9 PRE-INSTALLATION CONFERENCE

A.Convene a pre-installation conference at least one week prior to beginning work of this section

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- B.Attendance: Architect, Construction Manager, Contractor, Security Contractor, Hardware Supplier, Installer, Key District Personnel, and Project Inspector.
- C. Agenda: Review hardware schedule, products, installation procedures and coordination required with related work. Review District's keying standards.

## PART 2 - PRODUCTS

#### 1.1 MANUFACTURERS

| <u>Item</u>                        | <u>Manufacturer</u> | Acceptable Substitutes   |
|------------------------------------|---------------------|--------------------------|
| Hinges                             | Ives                | Hager, Stanley, McKinney |
| Locks, Latches<br>& Cylinders      | Schlage             | Or Approved Equal        |
| Exit Devices                       | Von Duprin          | Or Approved Equal        |
| Closers                            |                     | LCN Or Approved Equal    |
| Push, Pulls<br>& Protection Plates | lves                | Trimco, BBW, DCI         |
| Flush Bolts                        | Ives                | Trimco, BBW, DCI         |
| Dust Proof Strikes                 | Ives                | Trimco, BBW, DCI         |
| Coordinators                       | Ives                | Trimco, BBW, DCI         |
| Stops                              | Ives                | Trimco, BBW, DCI         |
| Overhead Stops                     | Glynn-Johnson       | Or Approved Equal        |
| Thresholds                         | Zero                | Pemko, National Guard    |
| Seals & Bottoms                    | Zero                | Pemko, National Guard    |

## 1.2 MATERIALS

A. Hinges: Exterior out-swinging door butts shall be non-ferrous material and shall have stainless steel hinge pins. All doors to have non-rising pins.

- 1. Hinges shall be sized in accordance with the following:
  - a. Height:
    - 1) Doors up to 42" wide: 4-1/2" inches.
    - 2) Doors 43" to 48" wide: 5 inches.

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- b. Width: Sufficient to clear frame and trim when door swings 180 degrees.
- c. Number of Hinges: Furnish 3 hinges per leaf to 7'-5" in height. Add one for each additional 2 feet in height.
- 2. Furnish non-removable pins (NRP) at all exterior out-swing doors and interior key lock doors with reverse bevels.
- B.Floor Closers: Shall be equipped with compression springs, cam and roller operating mechanism and a one piece spindle-cam for maximum operating performance and longevity.
- C. Pivots: High strength forgings and castings with precision bearings for smooth operation. Positive locking vertical adjustment mechanism to allow installer to precisely position the door and balance the load.
- D. Continuous Hinges: As manufactured by Ives, an Allegion Company. UL rated as required.
- E.Heavy Duty Cylindrical Locks and Latches: Schlage "ND" Series as scheduled with "Rhodes" design, fastened with through-bolts and threaded chassis hubs.
  - 1. Provide cylindrical locksets exceeding the ANSI/BHMA A156.2 Grade 1 performance standards for strength, security, and durability in the categories below:
    - a. Abusive Locked Lever Torque Test minimum 3,100 inch-pounds without gaining access
    - b. Offset lever pull minimum 1,600 foot pounds without gaining access
    - c. Vertical lever impact minimum 100 impacts without gaining access
  - Cycle life tested to minimum 16 million cycles per ANSI/BHMA A156.2
     Cycle Test with no visible lever sag or use of performance aids such as set screws or spacers
  - 3. UL 10C for 4'-0" x 10'-0" 3-hour fire door.
  - 4. Cylinders: Refer to "KEYING" article, herein.
  - 5. Provide solid steel anti-rotation through bolts and posts to control excessive rotation of lever.
  - 6. Provide lockset that allows lock function to be changed to over twenty other common functions by swapping easily accessible parts.
  - 7. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw capable of UL listing of 3 hours on a 4' x 10' opening. Provide proper latch throw for UL listing at pairs.
  - 8. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.

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- 9. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
- 10. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
- 11. Provide wired electrified options as scheduled in the hardware sets.
  - a. 12 through 24 volt DC operating capability, auto-detecting
  - b. Selectable EL (fail safe)/EU (fail secure) operating mode via switch on chassis
  - c. 0.230A (230mA) maximum current draw
  - d. 0.010A (10mA) holding current
  - e. Modular / "plug in" request to exit switch
- 12. Lever Trim: Solid cast levers without plastic inserts, and wrought roses on both sides.
- F. Deadlocks: Rotating cylinder trim rings of attack-resistant design. Mounting plates and actuator shields of plated cold-rolled steel. Mounting screws of ¼" diameter steel and protected by drill-resistant ball bearings. Steel alloy deadbolt with hardened steel roller. Strike alloy deadbolt with reinforcer and two 3" long screws. ANSI A156.5, 2001 Grade 1 certified.
- G. Exit devices: Von Duprin as scheduled.
  - 1. Provide certificate by independent testing laboratory that device has completed over 1,000,000 cycles and can still meet ANSI/BHMA A156.3 2001 standards.
  - 2. All internal parts shall be of cold-rolled steel with zinc dichromate coating.
  - 3. Mechanism case shall have an average thickness of .140".
  - 4. Compression spring engineering.
  - 5. Non-handed basic device design with center case interchangeable with all functions.
  - 6. All devices shall have quiet return fluid dampeners.
  - 7. All latchbolts shall be deadlocking with 3/4" throw and have a self-lubricating coating to reduce friction and wear.
  - 8. Device shall bear UL label for fire and or panic as may be required.
  - 9. All surface strikes shall be roller type and utilize a plate underneath to prevent movement.
  - 10. Lever Trim: "Breakaway" design, forged brass or bronze escutcheon with a minimum of .130" thickness, match lockset lever design.
  - 11. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key.
  - 12. Furnish glass bead kits for vision lites where required.
  - 13. All Exit Devices to be sex-bolted to the doors.
  - 14. Panic Hardware shall comply with CBC Section 11B.404.2.7 and shall be mounted between 34" and 44" above the finished floor surface.

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- a. Provide exit devices UL certified to meet maximum 5 pound requirements according to the California Building Code section 11B-309.4, and UL listed for Panic Exterior Fire Exit Hardware maximum opening force of 15 pounds according to the California Building Code section 11B-404.2.9.
  - 15. Hardware (including panic hardware) shall not be provided with "Night Latch" (NL) function for any accessible doors or gates unless the following conditions are met per DSA Interpretation 10-08 DSA/AC (External). Revised 4/28/09). Such conditions must be clearly demonstrated and indicated in the specification.
    - a. Such hardware has a 'dogging' feature.
    - b. It is dogged during the time the facility is open.
    - c. Such 'dogging' operation is performed only by employees as their job function (non-public use).
- H. Closers: LCN as scheduled. Place closers inside building, stairs, room, etc.
  - Door closer cylinders shall be of high strength cast iron construction with double heat treated pinion shaft to provide low wear operating capabilities of internal parts throughout the life of the installation. All door closers shall be tested to ANSI/BHMA A156.4 test requirements by a BHMA certified testing laboratory. A written certification showing successful completion of a minimum of 10,000,000 cycles must be provided.
  - All door closers shall be fully hydraulic and have full rack and pinion action with a shaft diameter of a minimum of 11/16 inch and piston diameter of 1 inch to ensure longevity and durability under all closer applications.
  - 3. All parallel arm closers shall incorporate one piece solid forged steel arms with bronze bushings. 1-9/16" steel stud shoulder bolts, shall be incorporated in regular arms, hold-open arms, arms with hold open and stop built in. All other closers to have forged steel main arms for strength, durability, and aesthetics for versatility of trim accommodation, high strength and long life.
  - 4. All parallel arm closers so detailed shall provide advanced backcheck for doors subject to severe abuse or extreme wind conditions. This advanced backcheck shall be located to begin cushioning the opening swing of the door at approximately 45 degrees. The intensity of the backcheck shall be fully adjustable by tamper resistant non-critical screw valve.
  - 5. Closers shall be installed to permit doors to swing 180 degrees.
  - 6. All closers shall utilize a stable fluid withstanding temperature range of 120 degrees F. to -30 degrees F. without requiring seasonal adjustment of closer speed to properly close the door.
  - 7. Provide the manufactures drop plates, brackets and spacers as required at narrow head rails and special frame conditions. NO wood plates or spacers will be allowed.

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- 8. Maximum effort to operate closers shall not exceed 5 lbs., such pull or push effort being applied at right angles to hinged doors. Compensating devices or automatic door operators may be utilized to meet the above standards. When fire doors are required, the maximum effort to operate the closer may be increased but shall not exceed 15 lbs. when specifically approved by fire marshal. All closers shall be adjusted to operate with the minimum amount of opening force and still close and latch the door. These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position. Per 11B-404.2.8.1, door shall take at least 5 seconds to move from an open position of 90 degrees to a position of 12 degrees from the latch jamb.
- I. Flush Bolts & Dust Proof Strikes: Automatic Flush Bolts shall be of the low operating force design. Utilize the top bolt only model for interior doors where applicable and as permitted by testing procedures.
  - 1. Manual flush bolts only permitted on storage or mechanical openings as scheduled.
  - 2. Provide dust proof strikes at openings using bottom bolts.

## J. Door Stops:

- 1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
- 2. Do not install floor stops more than four (4) inches from the face of the wall or partition (CBC Section 11B-307).
- 3. Overhead stops shall be made of stainless steel and non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
- K.Protection Plates: Fabricate either kick, armor, or mop plates with four beveled edges. Provide kick plates 10" high and 2" LDW. Sizes of armor and mop plates shall be listed in the Hardware Schedule. Furnish with machine or wood screws of bronze or stainless to match other hardware.
- L. Thresholds: As Scheduled and per details.
  - 1. Thresholds shall not exceed 1/2" in height, with a beveled surface of 1:2 maximum slope.
  - 2. Set thresholds in a full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 7 "Thermal and Moisture Protection".
  - 3. Use 1/4" fasteners, red-head flat-head sleeve anchors (SS/FHSL).
  - 4. Thresholds shall comply with CBC Section 11B-404.2.5.
- M. Seals: Provide silicone gasket at all rated and exterior doors.

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- 1. Fire-rated Doors, Resilient Seals: UL10C Classified complies with NFPA 80 & NFPA 252. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements.
- Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C Classified complies with NFPA 80 & NFPA 252. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required.
- 3. Smoke & Draft Control Doors, Provide UL10C Classified complies with NFPA 80 & NFPA 252 for use on "S" labeled Positive Pressure door assemblies.
- N. Door Shoes & Door Top Caps: Provide door shoes at all exterior wood doors and top caps at all exterior out-swing doors.
- O. Silencers: Furnish silencers for interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where sound or light seals occurs, or for fire-resistive-rated door assemblies.

#### 1.3 KEYING

- A.Furnish PrimusXP "Classic" keyway Patent Protected Schlage cylinders where noted. Furnish all other cylinders in matching conventional "Classic" keyway. Furnish Patent Protected Schlage keys for all cylinders. (e.g. Primus XP Classic Keyway for patent protected / Maximum control) (with mix of conventional "Classic" keyway)
- B. Furnish construction keying for doors requiring locking during construction.
  - 1. For FSIC systems provide 23-030-ICX Full Size Construction Cores
  - 2. For FSIC systems provide ten 48-101-ICX Construction Keys
  - 3. For FSIC systems provide two 48-056-ICX Control Keys (const.)
  - 4. For FSIC systems provide two control keys for installing the permanent cores (49-056 for "Classic" keyways, 48-052-XP for "Classic Primus") (49-003 for "Everest Conventional", 48-005–XP for "Everest Primus")
- C. Furnish all keys with visual key control.
  - 1. Stamp key "Do Not Duplicate".
  - 2. Delete key section identifier from the key bow.
- D. Furnish all cylinders with visual key control.
  - 1. Stamp unique owner supplied code on cylinder side. (CKC) (6 character maximum).
- E. Furnish mechanical keys as follows:
  - 1. Furnish 2 cut change keys for each different change key code.
  - 2. Furnish 1 uncut key blank for each change key code.

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- 3. Furnish 6 cut masterkeys for each different masterkey set.
- 4. Furnish 3 uncut key blanks for each masterkey set.
- 5. Furnish 2 cut control keys cut to the top masterkey for permanent I/C cylinders.
- 6. Furnish 1 cut control key cut to each SKD combination.
- F. Furnish Schlage Padlocks and the cylinders to tie them into the masterkey system for gates, storage boxes, utility valve security, roof hatches and roll-up doors keyed as directed in the keying schedule.
  - 1. Furnish KS43D2200 padlock for use with non-I/C Schlage cylinders. Furnish 47-413 (conventional) or 47-743-XP (PrimusXP) with above.
  - 2. Furnish KS43G3200 padlock for use with FSIC Schlage cylinders. Furnish 23-030 (Classic / Everest) or 20-740 (PrimusXP) with above.
  - 3. Furnish KS41D1200 padlock for use with SFIC Schlage cylinders. Furnish 80-037 (Everest-B) with above.
- G. Furnish one Schlage cabinet lock for each cabinet door or drawer so designated on the drawings or keying schedule to match the masterkey system.
  - 1. Furnish CL100PB for use with non-I/C Schlage cylinders.
  - 2. Furnish CL77R for use with FSIC Schlage cylinders.
  - 3. Furnish CL721G for use with SFIC Schlage cylinders.

### 1.4 FINISHES

- A.Generally to be satin chrome US26D (626 on bronze and 652 on steel) unless otherwise noted.
- B.Furnish push plates, pull plates and kick or armor plates in satin stainless steel US32D (630) unless otherwise noted.
- C. Door closers shall be powder-coated to match other hardware, unless otherwise noted.
- D. Aluminum items to be finished anodized aluminum except thresholds which can be furnished as standard mill finish.

#### 1.5 FASTENERS

- A. Screws for strikes, face plates and similar items shall be flat head, countersunk type, provide machine screws for metal and standard wood screws for wood.
- B.Screws for butt hinges shall be flathead, countersunk, full-thread type.
- C. Fastening of closer bases or closer shoes to doors shall be by means of sex bolts and spray painted to match closer finish.
- D. Provide expansion anchors for attaching hardware items to concrete or masonry.

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- E.All exposed fasteners shall have a phillips head.
- F. Finish of exposed screws to match surface finish of hardware or other adjacent work.
- G. All Exit Devices and Lock Protectors shall be fastened to the door by the means of sex bolts or through bolts.

## PART 3 - EXECUTION

### 1.1 INSPECTION

- A. Verify that doors and frames are square and plumb and ready to receive work and dimensions are as instructed by the manufacturer.
- B.Beginning of installation means acceptance of existing conditions.
- C. Fire-Rated Door Assembly Inspection: Upon completion of the installation, all fire door assemblies shall be inspected to confirm proper operation of the closing device and latching device and that only the manufacturer's furnished fasteners are used for installation and that it meets all criteria of a fire door assembly per NFPA 80 (Standard for Fire Doors and Other Opening Protectives) 2016 Edition. A written record shall be maintained and transmitted to the Owner to be made available to the Authority Having Jurisdiction (AHJ). The inspection of the swinging fire doors shall be performed by a certified FDAI (Fire Door Assembly Inspector) with knowledge and understanding of the operating components of the type of door being subjected to the inspection. The record shall list each fire door assembly throughout the project and include each door number, an itemized list of hardware set components at each door opening, and each door location in the facility.

### 1.2 INSTALLATION

- A.Install hardware in accordance with manufacturer's instructions and requirements of DHI.
- B.Use the templates provided by hardware item manufacturer.
- C. Mounting heights for hardware shall be as recommended by the Door and Hardware Institute. Operating hardware will to be located between 34" and 44" AFF.
- D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- E.Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- F. Set thresholds for exterior doors in full bed of butyl-rubber sealant.

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- G. If hand of door is changed during construction, make necessary changes in hardware at no additional cost.
- H. Hardware Installer shall coordinate with security contractor to route cable to connect electrified locks, panic hardware and fire exit hardware to power transfers or electric hinges at the time these items are installed so as to avoid disassembly and reinstallation of hardware.
- I. Hardware Installer shall also be present with the security contractor when the power is turned on for the testing of the electronic hardware applications. Installer shall make adjustments to solenoids, latches, vertical rods and closers to insure proper and secure operation.
- J. All wiring for electro-mechanical hardware mounted on the door shall be connected through the power transfer and terminated in the interface junction box specified for in the Electrical Section.
- K.Conductors shall be minimum 18 gage stranded, multicolored. A minimum 12 in. loop of conductors shall be coiled in the interface junction box. Each conductor shall be permanently marked with its function.
- L. If a power supply is specified in the hardware sets, all conductors shall be terminated in the power supply. Make all connections required for proper operation between the power supply and the electro-mechanical hardware. Provide the proper size conductors as specified in the manufacturer's technical documentation.

## 1.3 ADJUST AND CLEAN

- A.Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
- B.Clean adjacent surface soiled by hardware installation.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy, return to that work area and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware finishes, during the final adjustment of hardware.
- E.Continued Maintenance Service: Approximately six months after the completion of the project, the Contractor accompanied by the Architectural Hardware Consultant, shall return to the project and re-adjust every item of hardware to restore proper functions of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design,

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materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

## 1.4 HARDWARE LOCATIONS

A.Conform to CCR, Title 24, Part 2; and ADAAG; and the drawings for access-compliant positioning requirements for the disabled.

### 1.5 FIELD QUALITY CONTROL

A.Contractor is responsible for providing the services of an Architectural Hardware Consultant (AHC) or a proprietary product technician to inspect installation and certify that hardware and its installation have been furnished and installed in accordance with manufacturers' instructions and as specified herein.

## 1.6 SCHEDULE

- A. The items listed in the following schedule shall conform to the requirements of the foregoing specifications.
- B.While the hardware schedule is intended to cover all doors, and other movable parts of the building, and establish type and standard of quality, the contractor is responsible for examining the Plans and Specifications and furnishing proper hardware for all openings whether listed or not. If there are any omissions in hardware groups in regard to regular doors they shall be called to the attention of the Architect prior to bid opening for instruction; otherwise, list will be considered Complete. No extras will be allowed for omissions.
- C. The Door Schedule on the Drawings indicates which hardware set is used with each door.

### Manufacturers Abbreviations (Mfr.)

| ADA   | = | Adams Rite Mfg.           | Aluminum Door Hardware                       |
|-------|---|---------------------------|----------------------------------------------|
| GLY   | = | Glynn-Johnson Corporation | Overhead Door Stops                          |
| IVE   | = | Ives                      | Hinges, Pivots, Bolts, Coordinators, Dust    |
| Proof |   |                           | Strikes, Push Pull & Kick Plates, Door Stops |
| &     |   |                           | Silencers                                    |
| JOH   | = | L.E. Johnson              | Sliding Door Hardware                        |
| LCN   | = | LCN                       | Door Closers                                 |
| SCE   | = | Schlage Electronics       | Electronic Door Components                   |
| SCH   | = | Schlage Lock Company      | Locks, Latches & Cylinders                   |
| TRI   | = | Trimco                    | Signs                                        |
| VON   | = | Von Duprin                | Exit Devices                                 |
| ZER   | = | Zero International        | Thresholds, Gasketing & Weather-stripping    |

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## **HARDWARE GROUP NO. 02**

| QTY<br>1<br>2<br>1<br>1           | EA<br>EA<br>EA             | DESCRIPTION VANDL CLASSROOM SEC PRIMUS CORE OH STOP                                  | CATALOG NUMBER ND95JD RHO XN12-035 20-740 90S BALANCE OF HARDWARE EXISTING                      | FINISH<br>626<br>626<br>630                      | MFR<br>SCH<br>SCH<br>GLY                      |
|-----------------------------------|----------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------|
| HARD                              | WARE 0                     | GROUP NO. 03                                                                         |                                                                                                 |                                                  |                                               |
| QTY<br>1<br>2<br>1                | EA<br>EA                   | DESCRIPTION<br>VANDL CLASSROOM SEC<br>PRIMUS CORE                                    | CATALOG NUMBER<br>ND95JD RHO XN12-035<br>20-740<br>BALANCE OF HARDWARE<br>EXISTING              | FINISH<br>626<br>626                             | MFR<br>SCH<br>SCH                             |
| HARD                              | WARE G                     | GROUP NO. 06                                                                         |                                                                                                 |                                                  |                                               |
| QTY<br>3<br>1<br>1<br>1<br>1<br>3 | EA<br>EA<br>EA<br>EA<br>EA | DESCRIPTION HINGE VANDL STOREROOM LOCK PRIMUS CORE OH STOP SURFACE CLOSER SILENCER   | CATALOG NUMBER 5BB1 4.5 X 4.5 ND96JD RHO 20-740 100S 4040XP EDA SR64                            | FINISH<br>652<br>626<br>626<br>630<br>689<br>GRY | MFR<br>IVE<br>SCH<br>SCH<br>GLY<br>LCN<br>IVE |
| HARD                              | WARE G                     | GROUP NO. 07                                                                         |                                                                                                 |                                                  |                                               |
| QTY<br>3<br>1<br>1<br>1<br>1<br>3 | EA<br>EA<br>EA<br>EA<br>EA | DESCRIPTION HINGE VANDL STOREROOM LOCK PRIMUS CORE SURFACE CLOSER WALL STOP SILENCER | CATALOG NUMBER 5BB1 4.5 X 4.5 ND96JD RHO 20-740 4040XP EDA WS406/407CVX SR64                    | FINISH<br>652<br>626<br>626<br>689<br>630<br>GRY | MFR IVE SCH SCH LCN IVE IVE                   |
| HARD                              | WARE G                     | GROUP NO. 08                                                                         |                                                                                                 |                                                  |                                               |
| QTY<br>3<br>1<br>2<br>1           | EA<br>EA<br>EA<br>EA       | DESCRIPTION HINGE VANDL CLASSROOM SEC PRIMUS CORE SURFACE CLOSER WALL STOP           | CATALOG NUMBER<br>5BB1 4.5 X 4.5<br>ND95JD RHO XN12-035<br>20-740<br>4040XP EDA<br>WS406/407CVX | FINISH<br>652<br>626<br>626<br>689<br>630        | MFR<br>IVE<br>SCH<br>SCH<br>LCN<br>IVE        |

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## **HARDWARE GROUP NO. 09**

| QTY |    | DESCRIPTION          | CATALOG NUMBER               | FINISH | MFR |
|-----|----|----------------------|------------------------------|--------|-----|
| 3   | EA | HINGE                | 5BB1 4.5 X 4.5               | 652    | IVE |
| 1   | EA | PRIVACY W/ INDICATOR | L9056J 06N L583-363 L283-722 | 626    | SCH |
| 2   | EA | PRIMUS CORE          | 20-740                       | 626    | SCH |
| 1   | EA | SURFACE CLOSER       | 4040XP SCUSH                 | 689    | LCN |
| 1   | EA | GASKETING            | 188SBK PSA                   | BK     | ZER |

**END OF SECTION** 

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# SECTION 09 30 13 CERAMIC TILE

# **PART 1 - GENERAL**

## 1.1 SECTION INCLUDES

- A. Glazed ceramic tile.
- B. Unglazed ceramic tile.
- C. Porcelain Tile Wall Panels.
- D. Cementitious backing board.
- E. Grout.
- F. Accessories.

# 1.2 REFERENCES (USE DATE OF STANDARD IN EFFECT AS OF BID DATE)

- A. ANSI/TCA A108.5 Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.
- B. ANSI/TCA A108.11 Interior Installation of Cementitious Backer Units.
- C. ANSI/TCA A118.1 Dry-Set Portland Cement Mortar.
- D. ANSI/TCA A118.4 Latex-Portland Cement Mortar.
- E. ANSI/TCA A118.6 Ceramic Tile Grouts.
- F. ANSI/TCA A118.9 Test Methods and Specifications for Cementitious Backer Units.
- G. ANSI/TCA A137.1 Specifications for Ceramic Tile.
- H. ASTM C1028 Static Coefficient of Friction of Ceramic Tile.
- I. ASTM D226 Asphalt-Saturated Felt Used in Roofing and Waterproofing.
- J. ASTM D2047 Static Coefficient of Friction Test.
- K. TCA (Tile Council of America) Handbook for Ceramic Tile Installation.

# 1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00, Submittals.

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- B. Submit Product Data for all materials specified.
- C. Samples: Mount tile and apply grout on two 24 inch x 24 inch plywood panels, representative of pattern, color variations, and grout joint size variations.
- D. Submit manufacturer's installation instructions, maintenance data, and recommended cleaning and stain removal methods and cleaning materials.

#### E. CHPS Submittals:

1. Credit EQ2.0D.P1: Provide product data, MSDS, and other official literature from manufacturer clearly identifying that the adhesives and sealants meet the testing requirements and threshold limits of the State of California Department of Health Services (DHS) Standard Practice for the Testing of Volatile Organic Compounds. Such products shall be either identified on the CHPS Low-Emitting Materials Product List or by a 3<sup>rd</sup> party certification program listing low-emitting material products that meet the State testing requirements, as identified on the CHPS website.

## 1.4 QUALITY ASSURANCE

- A. Conform to ANSI/TCA A137.1 for tile material.
- B. Conform to ANSI/TCA Standards and TCA Handbook for tile installation.

# 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum five years documented experience.
- B. Installer: Company specializing in applying the Work of this Section with minimum five years documented experience.
- C. Installer for thin porcelain tile panels to have a minimum of three documented years installation experience with this specific product.

## 1.6 ENVIRONMENTAL REQUIREMENTS

A. Maintain 50 degrees Fahrenheit during installation of mortar materials.

# 1.7 EXTRA STOCK

- A. Provide extra quantity of full size tile and trim shape units to District under provisions of Section 01 70 00.
- B. Provide quantity equal to 2 percent of units installed of each shape and color.

# **PART 2 - PRODUCTS**

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## 2.1 MANUFACTURERS - TILES

- A. Dal-Tile Corp., "Natural Hues" Series.
- B. Dal-Tile Corp. Mosaic, Colorbody Porcelain
- C. Substitutions under the provisions of Section 01 25 13, Product Options and Substitutions.

## 2.2 TILE MATERIAL

- A. Ceramic Wall Tile: Clay Eco-Body
  - 1. Moisture Absorption: Over 3.0 percent.
  - 2. Pattern: To be selected by Architect from manufacturer's full range of patterns.
  - 3. Size: 6 inches x 12 inches
  - 4. Tile Thickness: 5/16.
  - 5. Surface Finish: Matt Glazed.
  - 6. Grout Joint Recommendation: 1/4" approximate.
  - 7. Color(s): To be selected by Architect from manufacturer's full range of colors.
  - 8. Eco-Body: 17% Post consumer recycled glass, 17% post industrial.
- B. Ceramic Floor Tile: Mosaic Colorbody Porcelain/Keystones.
  - 1. Pattern: To be selected by Architect from manufacturer's full range of patterns.
  - 2. Size: 3 inches x 3 inches.
  - 3. Thickness: 1/4".
  - 4. Grout Joint Recommendations: 1/8" approximate.
  - 5. Surface Finish: Non-Slip with Coefficient of friction of 0.60 or greater, when tested in acceptance with ASTM C1028 or ASTM D2047.

## 2.3 MANUFACTURERS - MORTAR AND GROUT

A. As recommended by the manufacturer for the application indicated.

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## 2.4 MORTAR MATERIALS

- A. Portland Cement Mortar Materials: ANSI/TCA A118.1.
- B. Latex-Portland Cement Mortar: ANSI/TCA A118.4.
  - 1. Acrylic resin latex additive.
  - 2. Dry mortar mix supplied by latex manufacturer.
- C. Porcelain Tile Panels:
  - 1. ProLite Large Format Tile & Stone Mortar, by Custom Building Products.

## 2.5 GROUT MATERIALS

- A. Portland Cement Grout Materials: ANSI/TCA A118.6, commercial type.
- B. Latex-Portland Cement Grout: ANSI/TCA A118.6 of color selected and the following:
  - 1. Acrylic resin latex additive.
  - 2. Dry mortar mix supplied by latex manufacturer.

#### 2.6 ACCESSORIES

- A. Membrane: ASTM D226; No. 15 asphalt saturated roofing felt.
- B. Backing Board: ANSI/TCA A118.9; high density, cementitious, glass fiber reinforced, 1/2 inch thick minimum; 2 inch wide coated glass fiber tape for joints and corners; manufacturer shall be licensed by TCA.
- C. Sealant: Type specified in Section 07 90 00.
- D. Shower Liner: Oatey CPE Pan liner

# 2.7 MORTAR MIX AND GROUT MIX

- A. Mix and proportion pre-mix setting bed and grout materials in accordance with manufacturer's instructions and referenced standards.
- B. [Epoxy Grout employ epoxy grout resin and hardener portions at floor and walls.]

# 2.8 SEALER

A. Tile and Grout Sealer: "Aqua Mix Penetrating Sealer" manufactured by Aqua Mix, Inc., (562) 946-6877, or approved equal.

## **PART 3 - EXECUTION**

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## 3.1 EXAMINATION

- A. Verify that surfaces are ready to receive Work.
- B. Beginning of installation means installer accepts condition of existing surfaces.

## 3.2 PREPARATION

- A. Protect surrounding Work from damage or disfiguration.
- B. Vacuum clean existing surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

# 3.3 INSTALLATION - GENERAL

- A. Install mortar, tile, and grout in accordance with ANSI/TCA 108.5 and applicable tile installation standards of the TCNA Handbook.
- B. Install membrane over substrate; weatherlap horizontal edges 4 inches, lap vertical edges 6 inches.
- C. Lay tile to pattern indicated. If not indicated, request from Architect. Do not interrupt tile pattern around openings.
- D. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Align wall, base, and floor joints.
- E. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar or excess grout.
- F. Form internal angles square and external angles bullnosed.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control joints free of mortar or grout. Apply sealant to joints.
- I. Allow tile to set for a minimum of 48 hours prior to grouting.
- J. Grout tile joints.
- K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

# 3.4 INSTALLATION - THINSET METHOD

A. Install mortar, tile, and grout in accordance with ANSI/TCA 108.5 and applicable tile installation standards of the TCA Handbook. Shower areas in accordance with TCA B415-09

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B. Install backing board in accordance with manufacturer's instructions and ANSI/TCA A108.11. Tape joints and corners; cover with skim coat of dry-set mortar to a feather edge.

# 3.5 INSTALLATION - MORTAR BED METHOD

A. Install mortar, tile, and grout in accordance with ANSI/TCA 108.5 and applicable tile installation standards of the TCNA Handbook. Shower areas in accordance with TCA B414-09

# 3.7 CLEANING

- B. Clean Work under provisions of 01 70 00.
- C. Clean tile surfaces.

# 3.8 SEALING

D. Install sealer on all surfaces in accordance with manufacturer's instructions.

## **END OF SECTION**

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# SECTION 09 67 01 FLUID-APPLIED EPOXY FLOORING

# **PART 1 - GENERAL**

# 1.1 SECTION INCLUDES

- A. Fluid-applied dampproofing and leveling coats.
- B. Fluid-applied epoxy flooring and wall base with epoxy top coat.
- C. Quartz chip aggregate.
- D. Coves and other accessories.

# 1.2 REFERENCES (USE DATE OF STANDARD IN EFFECT AS OF BID DATE)

- A. ACI Committee 503.1 Adhesion.
- B. ASTM C307 Tensile Properties.
- C. ASTM C580 Flexural Strength.
- D. ASTM D579 Compressive Properties.
- E. ASTM D1044 Resistance of Transparent Plastic Materials to Abrasion.
- F. ASTM D2240 Surface Hardness.
- G. ASTM E648/NFPA 253 Flammability.
- H. ASTM F-1869 Vapor Emissions.
- I. MIL D 3134 Impact Resistance Water Absorption.
- J. Gardner Impact Tester Impact Resistance.
- K. ACI Committee #403/PP Bond Strength.
- L. MIL 3134F Indentation.
- M. UL Underwriters' Laboratories.
- N. NFPA 56A Electrical Conductivity.
- O. ASTM D-3363 Hardness.

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- P. ASTM D-2794 Impact Resistance.
- Q. ASTM D-1211 Thermal Shock.
- R. ASTM D-522, D-1737 Flexibility.
- S. ASTM D-1308 Chemical Resistance.
- T. ASTM D-695 Compressive Strength.
- U. ASTM D-638 Elongation.
- V. ASTM D-2240 Surface Hardness.
- W. ASTM D-695 Adhesion.
- X. ASTM D-1044 Wear Resistance.
- Y. TT-C-550 A Cleanability.
- Z. ASTM E-1745 Vapor Retarder.
- AA. ASTM F-1869 Vapor Emissions

# 1.3 COORDINATION

A. Coordinate Work of this Section with installation of concrete under Section 03 30 00 and installation of backing board under Section 09 28 13.

## 1.4 QUALIFICATIONS

- A. Installer Qualifications: Engage an experienced installer or applicator who has specialized for a minimum of 5 years in installing the specific resinous flooring system required for this Project and who is acceptable to manufacturer of primary materials. Installer must provide a minimum of 3 documented and inspectable installations within 25 mile radius of the subject project at least 5 years old with project names, dates, and owner contacts provided with the submittal. The installer shall furnish a list of projects using either specified material or equivalent that they have installed during the last three years. Information shall include project name, square footage, owner contact name with owner's address and phone number. Also, the installer shall furnish resumes detailing the experience of key personnel including supervisors and mechanics. The installer shall be approved in writing by the material manufacturer for the system being installed.
- B. Single-Source Responsibility: Obtain epoxy flooring system materials (including primers, resins, hardening agents, colored aggregates and finish or sealing coats), underlayments, vapor dissipation systems, anti-fracture membranes and waterproof membranes from a single primary manufacturer. Manufacturer shall be EPA-licensed to incorporate the antimicrobial into this system.

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## 1.5 REGULATORY REQUIREMENTS

A. Conform to applicable codes for flooring flame/fuel/smoke ratings in accordance with UL.

## 1.6 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Submit letter verifying installer qualifications.
- C. Product Data: Submit manufacturer's technical data, application instructions and general recommendations for the epoxy flooring specified herein.
- D. Warranty Letter: Letter from single-source manufacturer offering joint manufacturer/installer, labor/material warranty for the complete flooring system on this specific Project.
- E. Submit Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors and finishes available.
  - 1. Submit 24-inch square x 12-inch high inside corner/flooring/cove base Samples prepared by the actual installer in colors designated by the Architect. Factory Samples not acceptable.
  - 2. Submit 3 different 12-inch square nonslip texture Samples for Owner's approval.
- F. Material certificates signed by manufacturer certifying that the epoxy flooring and supplemental products comply with requirements specified herein.
- G. Maintenance Instructions: Submit manufacturer's written instructions for recommended maintenance practices.

# 1.7 OPERATION AND MAINTENANCE DATA

- A. Submit cleaning and maintenance data under provisions of Section 01 70 00.
- B. Include procedures for stain removal, repairing surface, and cleaning.

# 1.8 DELIVERY, STORAGE, AND HANDLING\

- A. Deliver, store, and protect products under provisions of Section 01 87 00.
- B. Store materials in a dry, secure area.
- C. Maintain temperature of 55 degrees Fahrenheit.
- D. Keep products away from fire or open flame.

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E. Store materials to comply with manufacturer's directions to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

## 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Environmental Conditions: Comply with epoxy flooring manufacturer's directions for maintenance of ambient and substrate temperature, moisture, humidity, ventilation, and other conditions required to execute and protect Work.
- B. Lighting: Permanent lighting will be in place and working before installing flooring.
- C. Vapor Emissions: Contractor shall provide proper climatized conditions and hire testing agency to determine vapor emissions in accordance with ASTM F-1869. One test shall be conducted for the first 100 square feet, then one test per each additional 100 square feet in temperature/humidity conditions similar to normal occupancy.
- D. Ventilate area where flooring is being installed. Post and enforce "NO SMOKING" or "OPEN FLAME" signs until flooring has cured.
- E. Restrict traffic from area where flooring is being installed or is curing.

#### 1.10 WARRANTY

- A. Provide two-year unconditional warranty under provisions of Section 01 70 00.
- B. Warranty: Include coverage for delamination of floor and base materials from substrate, degradation of surface finish.

## **PART 2 - PRODUCTS**

# 2.1 ACCEPTABLE MANUFACTURERS

- A. General Polymers Corporation.
- B. Crossfield Products Corp.
- C. Stonhard, Inc.
- D. Substitutions under provisions of Section 01 62 00.

# 2.2 DESIGN CRITERIA

A. The intention of this Specification is to have all components of the specified finishes provided, installed, warranted, and maintained by one prequalified installer.

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B. Components and their specific materials shall be compatible and warranted as such by the installer.

## 2.3 PERFORMANCE REQUIREMENTS

- A. Colors: As indicated, or if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
- B. Physical Properties:
  - Provide flooring system that meets or exceeds the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses. Values below are for the full system, not for individual components.
    - a. Thickness:1/4 inch.
    - b. Compressive Strength (ASTM C579): 8,576 psi.
    - c. Tensile Strength (ASTM C307): 1,619 psi.
    - d. Flexural Strength (ASTM D750): 10,000 psi.
    - e. Surface Hardness (ASTM D-2240): Durometer D 65-85.
    - f. Abrasion Resistance (ASTM D 4060): 100 mgs lost.
    - g. Indentation (MIL-D-3134): Less than 1.0 percent.
    - h. Impact Resistance (Gardner Impact Tester): No chipping, cracking, or delamination and not more than 0.014 inch indentation.
    - i. Adhesion (A.C.I. Comm. No. 503.1): Less than 350 psi (100 percent failure in concrete).
    - j. Flammability: Self-extinguishing over concrete.
  - 2. Provide antimicrobial 100% solids urethane top coat that meets or exceeds the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses.
- C. Products based on Crossfield Products Corp. as a level of quality:
  - Concrete Admixture: Shall be "Dex-O-Tex".
  - 2. Troweled epoxy mosaic composition flooring shall be (Antimicrobial) 1/4 inch Troweled Mosaic Mortar with Sustainable Aggregate System and with chemical resistant top finish.
  - 3. Vapor Dissipation System: Shall be warrantied for reduction of vapor emissions from 12 pounds to 3 pounds.

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- 4. Underlayment: Shall be furnished as part of the manufacturer's system.
- 5. Antimicrobial System: Shall be EPA-Licensed Antimicrobial System as provided by manufacturer. Fungicides shall not be acceptable.
- 6. Topcoat: Shall be high-performance urethane matte finish antimicrobial.
- 7. All products used in the floor system shall be manufactured by the same primary manufacturer.
- 8. All products used in the flooring system shall have a minimum 5-year documented usage in similar applications.

# 2.4 COLORS

A. Resin and Aggregate: Color as selected by Architect from manufacturer's standard color range.

## 2.6 ACCESSORIES

- A. Concrete Testing Equipment: American Moisture Test, Inc. (866) 670-9700.
  - 1. ASTM F1869 Water vapor emission.
  - 2. ASTM F2170 In-concrete relative humidity.

# **PART 3 - EXECUTION**

## 3.1 EXAMINATION AND INSPECTION

- A. Examine the areas and conditions where the epoxy flooring is to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Architect.
- B. Perform concrete moisture testing at a rate of three tests for areas up to 1,000 square feet and one test for each 1,000 square feet thereafter in accordance with the following test methods:
  - 1. ASTM F1869 water vapor emission: shall not exceed 3.0 lbs.
  - 2. ASTM F2170 in-concrete relative humidity: shall not exceed 80%.
- C. Where slab fails to meet the requirements of the paragraph above, vapor retarder as specified in Section 07 26 13.
- D. Beginning of installation means acceptance of substrate.

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## 3.2 PROTECTION

A. Protect elements surrounding the Work of this Section from damage or disfiguration.

## 3.3 PREPARATION

# A. Flooring System:

- Substrate: Perform preparation and cleaning procedures according to flooring manufacturer's instructions for particular substrate conditions involved, and as specified. Provide clean, dry, and neutral substrate for flooring application.
- 2. Concrete and Tile Surfaces: Shot-blast or power scarify as required to obtain optimum bond of flooring to concrete. Remove sufficient material to provide a sound surface free of laitance, glaze, efflorescence, and any bond-inhibiting curing compounds or form release agents. Remove grease, oil, and other penetrating contaminates. Repair damaged and deteriorated concrete to acceptable conditions. Leave surface free of dust, dirt, laitance, and efflorescence.

# 3. Cracks and Non-Expansion Joints:

- a. Cracks and joints less than 1/16 inch wide after surface preparation are to be filled with 3552 Epo-Flex mixed and applied as recommended by the manufacturer.
- b. Joints which are larger than 1/16 inch wide after surface preparation shall be routed 1/4 inch x 1/4 inch minimum and filled with "3552 Epo-Flex" mixed and applied recommended by the manufacturer.

## New Concrete:

- a. Concrete shall be limited to 4 inch thickness and receive proper vapor-barrier tie-in to existing vapor barrier and suitable reinforcement and doweling to existing concrete. Give concrete a light broom finish.
- No curing compounds shall be used. Paper cure is to be used for 3 days, then removed. Good ventilation is to be maintained for good drying.
- c. Concrete shall cure for minimum 2 weeks when designed in accordance with "Fast-Drying Concrete Recommendations."
- d. After 2 weeks' drying Contractor shall conduct vapor emission test and report to Architect. Architect then to direct the vapor dissipation

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system to be used (Vapor Shield I, II, III, or IV -- for emissions up to 6, 12, 18, and over 18 lbs, respectively).

- e. Flooring installer shall install designated vapor dissipation system.
- 5. Materials: Mix resin hardener and aggregate when required, and prepare materials according to floor/wall system manufacturer's instructions.

## 3.4 INSTALLATION - FLOORING AND BASE

- A. General: Apply each component of epoxy mosaic composition flooring system according to manufacturer's directions to produce a uniform monolithic flooring surface of thickness indicated.
- B. Waterproofing Membrane: Apply over all joints minimum of 1 inch either side of joint to manufacturer's recommended thickness.
- C. Bond Coat: Apply bond coat over prepared substrate at manufacturer's recommended spreading rate.
- D. Body Coat: Over primer, trowel apply epoxy mortar mix at nominal 1/4 inch thickness; hand or power trowel. Allow to cure before proceeding.
- E. Grout Coats: Apply two coats of grout. Sand and inspect the surface for consistency.
- F. Finish or Sealing Coats: After grout coats have cured sufficiently, apply finish coats of type recommended by flooring manufacturer to produce finish matching approved sample and in number of coats and spreading rates recommended by manufacturer.
  - 1. Final finish coat shall be in color and skid-retardant profile as approved by the Architect.
  - 2. Finish coat shall incorporate non-slip aggregate as selected by the Owner.
  - 3. Finished floor shall be 1/4 inch thick, uniform in color and free of trowel marks.
- G. Cove Base: Apply cove base mix to wall surfaces at locations shown to form cove base height of 4 inches unless otherwise indicated. Follow manufacturer's instructions and details including taping, mixing, priming, troweling, sanding, and top-coating of cove base.

# 3.5 TOLERANCES

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A. Maximum Variation from Flat Surface: 1/8 inch in 10 feet.

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B. Floor System Thickness Verification: At the Owner's discretion and under his supervision, the Contractor shall take 1 inch random cores per 1,000 sq. ft. through the system into the substrate to verify proper system thickness. Cored areas less than specified thickness shall be removed and replaced or increased in thickness by the installer, in a manner that does not affect the performance or integrity of the system. Cored areas which comply with the recommended system thickness shall be built up to match the surrounding surface elevation prior to applying the seal coat(s). Cores taken and patched will be noticeable; therefore, cores should be taken from areas where aesthetics are less critical.

# 3.6 CURING, PROTECTION AND CLEANING

- A. Cure epoxy mosaic composition flooring materials according to manufacturer's directions, taking care to prevent contamination during application stages and before completing curing process. Close application area for a minimum of 24 hours.
- B. Protect finished floor with wax paper. Use "Masonite", if rolling load traffic exists.
- C. Clean with manufacturer recommended cleaner.

## **END OF SECTION**

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# SECTION 10 28 00 TOILET AND BATH ACCESSORIES

# **PART 1 - GENERAL**

## 1.1 SECTION INCLUDES

- Toilet and washroom accessories.
- B. Mirror units.
- Concealed anchor devices and backing plate reinforcements furnished to other Sections.
- D. Attachment hardware.

# 1.2 REFERENCES (USE DATE OF STANDARD IN EFFECT AS OF BID DATE)

- A. ADAAG Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities.
- B. CCR California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.
- C. ASTM A123 Zinc (Hot-Dip Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips.
- D. ASTM A366 Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
- E. ASTM A386 Zinc Coating (Hot-Dip) on Assembled Steel Products.
- F. ASTM B456 Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- G. ASTM A167 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- H. ASTM A269 Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

## 1.3 SUBMITTALS

- A. Submit under provisions of Section 01 33 00, Submittals.
- B. Provide Product Data on accessories, describing size, finish, details of function, attachment methods.
- C. Submit manufacturer's installation instructions.

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# 1.4 KEYING

- A. Supply two keys for each accessory to Owner.
- B. Master key all accessories.

## 1.5 REGULATORY REQUIREMENTS

A. Conform to CBC, Chapter 11B and CCR, Title 24, Part 2, and ADAAG for access for the handicapped.

# 1.6 COORDINATION

- A. Coordinate the Work of this Section with other work.
- B. Coordinate the Work of this Section with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

# **PART 2 - PRODUCTS**

# 2.1 MANUFACTURERS

- A. Bobrick Washroom Equipment, Inc.
- B. American Specialties, Inc. (ASI).
- C. Bradley Corporation.
- D. Or approved equal. Substitutions under the provisions of Section 01 25 13, Product Options and Substitutions.

# 2.2 MATERIALS

- A. Sheet Steel: ASTM A366.
- B. Stainless Steel Sheet: ASTM A167, Type 304.
- C. Tubing: ASTM A269, stainless steel, Type 304.
- D. Adhesive: Two-component epoxy type waterproof.
- E. Fasteners, Screws, and Bolts: Hot-dip galvanized, tamperproof.
- F. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

## 2.3 FABRICATION

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- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from single sheet of stock, free of joints.
- C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- D. Back-paint components where contact is made with building finishes to prevent electrolysis.
- E. Shop-assemble components and package complete with anchors and fittings.
- F. Provide steel anchor plates, adapters, and anchor components for installation.
- G. Hot-dip galvanize all ferrous metal and fastening devices.

# 2.4 FACTORY FINISHING

- A. Galvanizing: ASTM A123 to 1.25 ounces per square yard.
- B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- C. Stainless Steel: No. 4 satin finish.

## **PART 3 - EXECUTION**

## 3.1 EXAMINATION

- A. Verify that site conditions are ready to receive Work and dimensions are as instructed by the manufacturer.
- B. Beginning of installation means acceptance of existing conditions.

# 3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site at appropriate time for building-in.
- B. Provide templates and rough-in measurements as required.
- C. Verify exact location of accessories for installation.

## 3.3 INSTALLATION

- A. Install fixtures, accessories and items in accordance with manufacturers' instructions.
- B. Install plumb and level, securely and rigidly anchored to substrate.

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C. Verify that no equipment in accessible toilet stalls protrudes past the face of the wall by more than 3 inches.

# 3.4 SCHEDULE

A. Model numbers refer to Bobrick products, as a standard of quality and performance.

| Model No.         | Description                                                         | Power | Remark |
|-------------------|---------------------------------------------------------------------|-------|--------|
| B-7120            | Surface Mounted Hand Dryer - ADA                                    |       |        |
| B-29744           | Semi-recessed Automatic Universal Roll Paper<br>Towel Dispenser     | -     | -      |
| B-1659            | Glass Mirror, reference Drawings for sizes                          | -     | -      |
| B-295             | Stainless steel shelf                                               | -     | -      |
| B-221             | Toilet seat cover dispenser                                         | -     | -      |
| B-239 x 34        | Custodian's mop and broom rack w/shelf                              | -     | -      |
| B-2888,<br>B-3888 | Toilet tissue dispenser, non-accessible stalls                      | -     | -      |
| B-3888            | Toilet tissue dispenser, accessible stalls                          | -     | -      |
| B-4388            |                                                                     |       |        |
| B-2112            | Soap dispenser                                                      | -     | -      |
| B-233             | Stainless steel clothes hook                                        | -     | -      |
| B-3706 25         | Recessed sanitary napkin dispenser - ADA                            | -     | -      |
| B-4388            | Recessed toilet tissue dispenser                                    | -     | -      |
| B-254             | Sanitary napkin disposal                                            | -     | -      |
| B-6806-99         | 1-1/2" diameter x 36" long grab bar refer to Drawings for anchorage | -     | -      |
| B-6806-99         | 1-1/2" diameter x 48" long grab bar refer to Drawings for anchorage |       |        |

# **END OF SECTION**

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# SECTION 22 00 50 BASIC PLUMBING MATERIALS AND METHODS

# **PART 1 - GENERAL**

# 1.1 SUMMARY

- A. Section Includes:
  - 1. Electric motors.
  - 2. Access Doors.
  - 3. Expansion loops.
  - 4. Flexible joints.
  - 5. Insulation

# 1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. This Section is a part of each Division 22 Section.

#### 1.3 ADDITIONAL REQUIREMENTS

- A. Furnish and install any incidental work not shown or specified which is necessary to provide a complete and workable system.
- B. Make all temporary connections required to maintain services during the course of this Contract without additional cost to the Owner. Notify the Owner seven days in advance before disturbing any service.
- C. Plumbing work done under this contract shall not adversely affect the operation of the existing plumbing systems.

## 1.4 REFERENCES AND STANDARDS

- A. Where material or equipment is specified to conform to referenced standards, it shall be assumed that the most recent edition of the standard in effect at the time of bid shall be used.
  - 1. CSA Canadian Standards Association International.
  - 2. ANSI American National Standards Institute.
  - 3. ASTM American Society for Testing and Materials.

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- 4. CCR California Code of Regulations.
  - a. Title 8 Division of Industrial Safety, Subchapter 7; General Industry Safety Orders, Articles 31 through 36.
- 5. NCPWB National Certified Pipe Welding Bureau.
- 6. CEC California Electrical Code.
- 7. NEMA National Electrical Manufacturers' Association.
- 8. NFPA National Fire Protection Association.
- 9. OSHA Occupational Safety and Health Act.
- 10. UL Underwriters' Laboratories, Inc.
- B. Requirements of Regulatory Agencies:
  - 1. The publications listed below form part of this specification; comply with provisions of these publications except as otherwise shown or specified.
    - a. California Building Code, 2019.
    - b. California Electrical Code, 2019.
    - c. California Energy Code, 2019.
    - d. California Fire Code, 2019.
    - e. California Green Building Standards Code, 2019.
    - f. California Mechanical Code, 2019.
    - g. California Plumbing Code, 2019.
    - h. California Code of Regulations, Title 24.
    - i. California Health and Safety Code.
    - j. CAL-OSHA.
    - k. California State Fire Marshal, Title 19 CCR.
    - National Fire Protection Association.
    - m. Occupational Safety and Health Administration.
    - n. Other applicable state laws.
  - 2. Nothing in Drawings or specifications shall be construed to permit work not conforming to these codes, or to requirements of authorities having

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jurisdiction. It is not the intent of Drawings or specifications to repeat requirements of codes except where necessary for clarity.

## 1.5 DRAWINGS

- A. Examine Contract Documents prior to bidding of work and report discrepancies in writing to Architect.
- B. Drawings showing location of equipment and materials are diagrammatic and job conditions will not always permit installation in location shown. The Plumbing Drawings show general arrangement of equipment and materials, etc., and shall be followed as closely as existing conditions, actual building construction, and work of other trades permit.
  - 1. Architectural and Structural Drawings shall be considered part of the Work. These Drawings furnish Contractor with information relating to design and construction of the Project. Architectural Drawings take precedence over Plumbing Drawings.
  - 2. Because of the small scale of Plumbing Drawings, not all offsets, fittings, and accessories required are shown. Investigate structural and finish conditions affecting the Work and arrange Work accordingly. Provide offsets, fittings, and accessories required to meet conditions. Inform Architect immediately when job conditions do not permit installation of equipment and materials in the locations shown. Obtain the Architects approval prior to relocation of equipment and materials.
  - 3. Relocate equipment and materials installed without prior approval of the Architect. Remove and relocate equipment and materials at Contactors' expense upon Architects' direction.
  - 4. Minor changes in locations of equipment, piping, etc., from locations shown shall be made when directed by the Architect at no additional cost to the Owner providing such change is ordered before such items of work, or work directly connected to same are installed and providing no additional material is required.
- C. Execute work mentioned in Specifications and not shown on Drawings, or vice versa, the same as if specifically mentioned or shown in both.

# 1.6 FEES AND PERMITS

- A. Obtain and pay for all permits and service required in installation of this work; arrange for required inspections and secure approvals from authorities having jurisdiction. Comply with requirements of Division 01.
- B. Arrange for utility connections and pay charges incurred, including excess service charges.

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 Bear the cost of construction related to utility services, from point of connection to utility services shown on Contract Documents. This includes piping, excavation, backfill, meters, boxes, check valves, backflow prevention devices, general service valves, concrete work, and the like, whether or not Work is performed by Contractor, local water/sanitation district, public utility, other governmental agencies or agencies' assigns.

## C. Coordination:

#### 1. General:

a. Coordinate plumbing Work with trades covered in other Specifications Sections to provide a complete, operable and sanitary installation of the highest quality workmanship.

# 2. Electrical Coordination:

- a. Refer to the Electrical Drawings and Specifications, Division 26, for service voltage and power feed wiring for equipment specified under this section. Contractor has full responsibility for the following items of work:
  - 1) Review the Electrical Drawings and Division 26 Specifications to verify that electrical services provided are adequate and compatible with equipment requirements.
  - 2) If additional electrical services are required above that indicated on Electrical Drawings and in Division 26, such as more control interlock conductors, larger feeder, or separate 120 volt control power source, include cost to furnish and install additional electrical services as part of the bid.
  - 3) Prior to proceeding with installation of additional electrical work, submit detailed drawings indicating exact scope of additional electrical work.

## Mechanical Coordination:

- Arrange for pipe spaces, chases, slots and openings in building structure during progress of construction, to accommodate mechanical system installation.
- b. Coordinate installation of supporting devices. Set sleeves in poured-in-place concrete and other structural components during progress of construction.
- c. Coordinate requirements for access panels and doors for mechanical items requiring access where concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

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d. Coordinate with other trades equipment locations, pipe, duct and conduit runs, electrical outlets and fixtures, air inlets and outlets, and structural and architectural features. Provide information on location of piping and seismic bracing to other trades as required for a completely coordinated project.

# 1.7 SUBMITTALS - GENERAL

- A. Refer to Division 01 Submittals Section(s) for additional requirements.
- B. Submittal packages may be submitted via email as PDF electronic files, or as printed packages. PDFs shall be legible at actual size (100 percent). Provide seven copies of printed submittal packages.
- C. Provide submittal of materials proposed for use as part of this Project. Product names in Specifications and on Drawings are used as standards of quality. Furnish standard items on specified equipment at no extra cost to the Contract regardless of disposition of submittal data. Other materials or methods shall not be used unless approved in writing by Architect. Architect's review will be required even though "or equal" or synonymous terms are used.
  - 1. Partial or incomplete submittals will not be considered.
  - 2. Quantities are Contractor's responsibility and will not be reviewed.
  - 3. Provide materials of the same brand or manufacturer for each class of equipment or material.
  - 4. Identify each item by manufacturer, brand, trade name, number, size, rating, or other data necessary to properly identify and review materials and equipment. Words "as specified" are not sufficient identification.
  - 5. Identify each submittal item by reference to items' Specification Section number and paragraph, by Drawing and detail number, and by unit tag number.
  - 6. Organize submittals in same sequence as in Specification Sections.
  - 7. Show physical arrangement, construction details, finishes, materials used in fabrications, provisions for piping entrance, access requirements for installation and maintenance, physical size, mechanical characteristics, foundation and support details, and weight.
    - a. Submit Shop Drawings, performance curves, and other pertinent data, showing size and capacity of proposed materials.
    - b. Specifically indicate, by drawn detail or note, that equipment complies with each specifically stated requirement of Contract Documents.

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- c. Drawings shall be drawn to scale and dimensioned (except schematic diagrams). Drawings may be prepared by vendor but must be submitted as instruments of Contractor, thoroughly checked and signed by Contractor before submission to Architect for review.
- d. Catalog cuts and published material may be included with supplemental scaled drawings.
- D. Review of submittals will be only for general conformance with design concept and general compliance with information given in Contract Documents. Review will not include quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with work of other trades, or construction safety precautions, which are sole responsibility of Contractor. Review of a component of an assembly does not indicate acceptance of an assembly. Deviations from Contract Documents not clearly identified by Contractor are Contractor's responsibility and will not be reviewed by Architect.
- E. Within reasonable time after award of contract and in ample time to avoid delay of construction, submit to Architect Shop Drawings or submittals on all items of equipment and materials provided. Provide submittal in at least seven copies and in complete package.
  - Shop Drawings and submittals shall include Specification Section, Paragraph number, and Drawing unit symbol or detail number for reference. Organize submittals into booklets for each Specification section and submit in loose-leaf binders with index. Deviations from the Contract Documents shall be prominently displayed in the front of the submittal package and referenced to the applicable Contract requirement.
- F. Furnish to the Project Inspector complete installation instructions on material and equipment before starting installation.

#### 1.8 ACTION SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data and installation instructions for plumbing systems materials and products.
- B. Shop Drawings.
- C. Sustainable Design Submittals:
  - 1. Product Data: For adhesives and sealants, documentation of compliance including printed statement of VOC content and chemical components.
  - 2. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.

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- D. Pipe, pipe or plumbing fittings, fixtures, solder and flux installed in a system providing water for human consumption shall comply with lead free requirements of the California Health and Safety Code Section 11 68 75. Provide submittal information for products third-party certified by an approved laboratory as complying with California Health and Safety Code Section 11 68 75.
- E. Seismic Shop Drawing Submittals: For seismic supports, anchorages, restraints, and vibration isolators indicated to comply with performance requirements and design criteria.
  - 1. Calculations performed for use in selection of seismic supports, anchorages, and restraints shall utilize criteria indicated in Structural Contract Documents.
  - 2. Include design calculations and details for selecting vibration isolators and vibration isolation bases complying with performance requirements, design criteria, and analysis data signed and sealed by the California registered structural engineer responsible for their preparation.
  - 3. Supports, anchorages and restraints for piping, ductwork, and equipment shall be an OSHPD pre-approved system such as OPM #0043-13, or equal. Pipes, ducts and equipment shall be seismically restrained in accordance with requirements of current edition of California Building Code. System shall have current OPM number and shall meet additional requirements of authority having jurisdiction. Provide supporting documentation required by the reviewing authority and the Architect and Engineer. Provide layout drawings showing piping, ductwork and restraint locations.
    - a. Bracing of Piping and Equipment: Specifically state how bracing attachment to structure is accomplished. Provide shop drawings indicating seismic restraints, including details of anchorage to building. In-line equipment must be braced independently of piping, and in conformance with applicable building codes. Provide calculations to show that pre-approval numbers have been correctly applied in accordance with general information notes of pre-approval documentation. Gas pipe bracing shall be designed in accordance with California Building Code Section 1615A.1.22 and ASCE 7-16 Section 13.6. Coefficient Ip = 1.5 shall be used for gas piping bracing calculations.
    - b. In lieu of the above or for non-standard installations not covered in the above pre-approved systems, Contractor shall provide layout drawings showing piping, ductwork, and restraint locations, and detail supports, attachments and restraints, and furnish supporting calculations and legible details sealed by a California registered structural engineer, in accordance with 2019 California Building Code

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4. Additional Requirements: In addition to the above, conform to all state and local requirements.

## 1.9 INFORMATIONAL SUBMITTALS

A. Provide layouts for plumbing systems, for inclusion in coordinated layout specified in Section 23 80 00. Comply with requirements for layouts specified in Section 23 80 00.

# 1.10 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data:
  - 1. Refer to Division 01 for complete instructions.
  - Furnish three complete sets of Operation and Maintenance Manual bound in hardboard binder, and one compact disc containing complete Operation and Maintenance Manual in searchable PDF format. Provide Table of Contents. Provide index tabs for each piece of equipment in binder and disc. Begin compiling data upon approval of submittals.
    - a. Sets shall incorporate the following:
      - 1) Product Data.
      - 2) Shop Drawings.
      - 3) Record Drawings.
      - 4) Service telephone number, address and contact person for each category of equipment or system.
      - 5) Complete operating and maintenance instructions for each item of plumbing equipment and systems.
      - 6) Copies of guarantees/warrantees for each item of equipment and systems.
      - 7) Test data and system balancing reports.
      - 8) Typewritten maintenance instructions for each item of equipment listing lubricants to be used, frequency of lubrication, inspections required, adjustment, etc.
      - 9) Manufacturers' bulletins with parts numbers, instructions, etc., for each item of equipment.
      - 10) Control diagrams and literature.

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- 11) A complete list or schedule of all scheduled valves giving the number of the valve, location and the rooms or area controlled by the valve. Identify each valve with a permanently attached metal tag stamped with number to match schedule. Post list in frame under plastic on wall in mechanical room or where directed by Architect.
- 12) Check test and start reports for each piece of plumbing equipment provided as part of the Work.
- 13) Commissioning and Preliminary Operation Tests required as part of the Work.
- b. Post service telephone numbers and/or addresses in an appropriate place as designated by the Architect.

# B. Record Drawings:

- 1. Refer to Division 01, Record Documents, for requirements governing Work specified herein.
- 2. Upon completion of the work, deliver to Architect the following:
  - a. Originals of drawings showing the Work exactly as installed.
  - b. One complete set of reproducible drawings showing the Work exactly as installed.
  - c. One compact disc with complete set of drawings in PDF format showing the Work exactly as installed.
  - d. Provide Contractor's signature, verifying accuracy of record drawings.
  - e. Obtain the signature of the Project Inspector for all record drawings.

# 1.11 SUBSTITUTIONS

- A. Refer to Division 01 for complete instructions. Requirements given below are in addition to or are intended to amplify Division 01 requirements. In the case of conflict between requirements given herein and those of Division 01, Division 01 requirements shall apply.
- B. It is the responsibility of Contractor to assume costs incurred because of additional work and or changes required to incorporate proposed substitute into the Project. Refer to Division 01 for complete instructions.
- C. Substitutions will be interpreted to be all manufacturers other than those specifically listed in the Contract Documents by brand name, model or catalog number.

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- D. Only one request for substitution will be considered for each item of equipment or material.
- E. Substitution requests shall include the following:
  - 1. Reason for substitution request.
  - 2. Complete submittal information as described herein; see "Submittals."
  - 3. Coordinated scale layout drawings depicting position of substituted equipment in relation to other work, with required clearances for operation, maintenance and replacement.
  - 4. List optional features required for substituted equipment to meet functional requirements of the system as indicated in Contract Documents.
  - 5. Explanation of impact on connected utilities.
  - 6. Explanation of impact on structural supports.
- F. Installation of reviewed substitution is the Contractors' responsibility. Any mechanical, electrical, structural, or other changes required for installation of reviewed substituted equipment or material must be made by the Contractor without additional cost to the Owner. Review by the Architect of the substituted equipment or material, including dimensioned Drawings will not waive these requirements.
- G. Contractor may be required to compensate the Architect for costs related to substituted equipment or material.

# 1.12 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of plumbing systems products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with plumbing systems work similar to that required for this Project.
- C. California Health and Safety Code Compliance: For products covered under the scope of HSC 116875 for potable water service. Products for potable water service shall be third-party certified by an approved laboratory as complying with California Health and Safety Code Section 11 68 75.
- D. Comply with applicable portions of California Plumbing Code pertaining to selection and installation of plumbing materials and products.
- E. All materials and products shall be new and shall match existing.

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# 1.13 DELIVERY, STORAGE, AND HANDLING

A. Protect equipment and piping delivered to Project site from weather, humidity and temperature variations, dirt, dust and other contaminants.

#### 1.14 FIELD CONDITIONS

- A. Contractor shall visit Project site and examine existing conditions in order to become familiar with Project scope. Verify dimensions shown on Drawings at Project site. Bring discrepancies to the attention of Architect. Failure to examine Project site shall not constitute basis for claims for additional work because of lack of knowledge or location of hidden conditions that affect Project scope.
- B. Information on Drawings relative to existing conditions is approximate. Deviations from Drawings necessary during progress of construction to conform to actual conditions shall be approved by the Architect and shall be made without additional cost to the Owner. The Contractor shall be held responsible for damage caused to existing services. Promptly notify the Architect if services are found which are not shown on Drawings.

## 1.15 WARRANTY

- A. Refer to Division 01 for warranty requirements, and duration and effective date of Contractor's Standard Guarantee.
- B. Repair or replace defective work, material, or part that appears within the warranty period, including damage caused by leaks.
- C. On failure to comply with the warranty requirements within a reasonable length of time after notification is given, the Architect/Owner shall have the repairs made at the Contractor's expense.

## **PART 2 - PRODUCTS**

# 2.1 GENERAL

- A. Materials or equipment of the same type shall be of the same brand wherever possible. All materials shall be new and in first class condition.
- B. All sizes, capacities, and efficiency ratings shown are minimum, except that gas capacity is maximum available.
- C. Refer to Sections 22 10 00 and 23 80 00 for specific system piping materials.

# 2.2 MATERIALS AND PRODUCTS

A. No material installed as part of this Work shall contain asbestos.

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B. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).

## 2.3 ELECTRIC MOTORS

- A. General Motor Requirements: Comply with NEMA MG 1 unless otherwise indicated. Comply with IEEE 841 for severe-duty motors.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
    - a. U.S. Motors.
    - b. Century Electric.
    - c. General Electric.
    - d. Lincoln.
    - e. Gould.
- B. Motor Characteristics: Designed for continuous duty at ambient temperature of 40 deg. C and at altitude of 3300 feet above sea level. Capacity and torque shall be sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
  - 1. Motors exceeding the nameplate amperage shall be promptly replaced at no cost to the Owner. Horsepower shown is minimum and shall be increased as necessary to comply with above requirements. Furnish motors with splash-proof or weatherproof housings, where required or recommended by the manufacturer. Match the nameplate voltage rating with the electrical service supplied. Check Electrical Drawings. Provide a transformer for each motor not wound specifically for system voltage.
- C. Polyphase Motors: NEMA MG 1, Design B, medium induction motor, premium efficiency as defined in NEMA MG 1. Select motors with service factor of 1.15. Provide motor with random-wound, squirrel cage rotor, and permanently lubricated or regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading. Temperature rise shall match insulation rating. Provide Class F insulation.
  - 1. Multispeed motors shall have separate windings for each speed.
- D. Polyphase Motors with Additional Requirements:

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- 1. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- 2. Motors Used with Variable Frequency Controllers:
  - a. Separately Connected Motors: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
  - b. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
  - c. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
  - d. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
  - e. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
  - f. Each motor shall be provided with a shaft grounding device for stray current protection.
- 3. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

# E. Single-Phase Motors:

- 1. Select motors with service factor of 1.15.
- 2. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
  - a. Permanent-split capacitor.
  - b. Split phase.
  - c. Capacitor start, inductor run.
  - d. Capacitor start, capacitor run.
- 3. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- 4. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- 5. Motors 1/20 HP and Smaller: Shaded-pole type.

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F. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

## 2.4 ACCESS DOORS

- A. Where floors, walls, or ceilings must be penetrated for access to mechanical equipment, provide access doors, 14 inch by 14 inch minimum size in usable opening. Where entrance of a serviceman may be required, provide 20 inch by 30 inch minimum usable opening. Locate access doors/panels for non-obstructed and easy reach.
  - 1. All access doors less than 7'-0" above floors and exposed to public access shall have keyed locks.
- B. Access doors shall match those supplied in Division 08 in all respects, except as noted herein.
- C. Provide stainless steel access doors for use in toilet rooms, shower rooms, kitchens and other damp areas. Provide steel access doors with prime coat of baked-on paint for all other areas.
- D. Do not locate access doors in highly visible public areas such as lobbies, waiting areas, and primary entrance areas. Coordinate with the Architect when access is required in these areas.
- E. Where specific information or details relating to access panels different from the above is shown or given on the Drawings or other Divisions of work, then that information shall supersede this specification.
- F. Manufacturers: Subject to compliance with requirements, available manufacturers offering products which may be incorporated into the Work include Milcor, Karp, Nystrom, or Cesco, equal to the following:
  - 1. Milcor
    - a. Style K (plaster).
    - b. Style DW (gypsum board).
    - c. Style M (Masonry).
    - d. Style "Fire Rated" where required.

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#### 2.5 THERMAL AND SEISMIC EXPANSION LOOPS

- A. Manufactured assembly consisting of inlet and outlet elbow fittings, two sections of flexible metal hose and braid, and 180-degree return bend. Return bend section shall have support lug and plugged FPT drain. Flexible hose shall consist of corrugated metal inner hose and braided metal outer sheath. Assemblies shall be constructed from materials compatible with the fluid or gas being conveyed and shall be suitable for the system operating pressure and temperature. Provide assembly selected for 4 inches of movement.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Metraflex Inc., Metraloop series, or comparable product by one of the following, or equal:
  - 1. Flexicraft Industries.

# 2.6 PIPE GUIDES

A. Where flexible connections are indicated on Drawings, provide Metraflex style IV, B-Line, or equal, pipe guides in locations recommended by manufacturer. Maximum spacing from flexible connection to first pipe guide is 4 pipe diameters, and maximum spacing from second pipe guide is 14 pipe diameters

# 2.7 EQUIPMENT IDENTIFICATION

A. Identify each piece of equipment with a permanently attached engraved bakelite plate, 1/2 inch high white letters on black background.

## 2.8 PIPE IDENTIFICATION

- A. Identify each piping system and indicate the direction of flow by means of Seton, Inc., Marking Services Inc., Reef Industries, Inc., or equal, pretensioned, coiled semi-rigid plastic pipe labels formed to circumference of pipe, requiring no fasteners or adhesive for attachment to pipe.
- B. The legends and flow arrows shall conform to ASME A13.1.

# 2.9 INSULATION WORK

## A. General:

- 1. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).
- 2. Adhesives and sealants shall comply with testing and product requirements of South Coast Air Quality Management District, Rule 1168.
- 3. The term "piping" used herein includes pipe, valves, strainers and fittings.

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- 4. Apply insulating cement to fittings, valves and strainers and trowel smooth to the thickness of adjacent covering. Cover with jacket to match piping. Extend covering on valves up to the bonnet. Leave strainer cleanout plugs accessible.
- 5. Provide pre-formed PVC valve and fitting covers.
- 6. Provide Calcium Silicate rigid insulation and sheet metal sleeve, 18 inch minimum length at each pipe hanger. Seal ends of insulation to make vapor tight with jacket.
- 7. Test insulation, jackets and lap-seal adhesives as a composite product and confirm flame spread of not more than 25 and a smoke developed rating of not more than 50 when tested in accordance with UL723 or ASTM E84.
- 8. Clean thoroughly, test and have approved, all piping and equipment before installing insulation and/or covering.
- 9. Repair all damage to existing pipe and equipment insulation whether or not caused during the work of this contract, to match existing adjacent insulation for thickness and finish, but conforming to flame spread and smoke ratings specified above.

# B. Insulation of Piping:

- 1. Insulate domestic hot and tempered water with minimum 3-1/2 pounds per cubic foot density fiberglass with ASJ-SSL jacket. Insulation thickness shall be the following:
  - a. Pipe 3/4 inches and smaller: 1 inch thick.
  - b. Pipe 1 inch through 1-1/2 inches: 1-1/2 inches thick.
  - c. Pipe 2 inches and larger: 2 inches thick.
- 2. Insulate domestic hot water piping under slab on grade with Owens Corning Foamglas, preformed pipe insulation, or equal. Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Cover pipe and fittings with insulation manufacturer's recommended jacketing. Insulation thickness shall be the following:
  - a. Pipe 3/4 inches and smaller: 2 inches thick.
  - b. Pipe 1 inch and larger: 3 inches thick.
- Insulate domestic cold water piping located within building, outside of insulation envelope in outside walls, vented attic spaces, and unheated spaces, including equipment rooms and below raised floor with 1 inch thick molded fiberglass, minimum 3-1/2 pound per cubic foot density, with ASJ-SSL jacket.

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- 4. Insulate domestic cold water piping located outside building exposed to weather with minimum 3-1/2 pounds per cubic foot density fiberglass with ASJ-SSL jacket. Insulation thickness for all pipe sizes: 2 inches.
- 5. Insulate roof drain and overflow drain bodies, horizontal sections of rainwater leader piping and overflow piping, and condensate drains within the building envelope with 1 inch thick fiberglass, minimum 3-1/2 pound per cubic foot density, with ASJ-SSL jacket.
- 6. Insulate condensate drain piping in freezer with 3/4 inch thick Therma-Cel, Armaflex, or equal. Seal water tight per manufacturer's directions. Install heat tape prior to insulation of piping, in accordance with manufacturer's directions.
- 7. Exposed insulated piping within the building shall have a Zeston 2000 25/50, Proto Lo-Smoke, or equal, PVC jacket and fitting cover installed over the insulation, applied per manufacturer's instructions. Insulation shall be vapor tight before applying PVC jacket and fitting covers. Verify suitability with manufacturer of insulation. Insulation with pre-applied polymer jacket may be substituted at Contractor's option.
- 8. Where insulated piping is exposed to the weather apply aluminum jacket secured with 1/2 inch stainless-steel bands on 12 inch centers. Insulation shall be vapor tight before applying metal jacket, and aluminum fitting covers. Install jacketing with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Cover fittings with glass cloth, two coats of Foster Sealfas 30-36, and factory-fabricated aluminum fitting covers, of same material, finish, and thickness as jacket. Insulation shall be vapor tight before applying metal jacket and fitting covers.
  - a. Fitting covers:
    - 1) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
    - 2) Tee covers.
    - 3) Flange and union covers.
    - 4) End caps.
    - 5) Beveled collars.
    - 6) Valve covers.
    - 7) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
  - b. Jacket thickness:

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- 1) Pipes 10 inches diameter and smaller: Minimum .016 inch thick jacket with smooth finish.
- 2) Pipes 12 inches diameter and larger: Minimum .020 inch thick jacket with smooth finish.

# **PART 3 - EXECUTION**

# 3.1 EXISTING MATERIALS

- A. Remove existing equipment, piping, wiring, construction, etc., which interferes with Work of this Contract. Promptly return to service upon completion of work in the area. Replace items damaged by Contractor with new material to match existing.
- B. Removed materials which will not be re-installed and which are not claimed by Owner shall become property of Contractor and shall be removed from Project site. Consult Owner before removing any material from Project site. Carefully remove materials claimed by Owner to prevent damage and deliver to Ownerdesignated storage location.
- C. Existing piping and wiring not reused and are concealed in building construction may be abandoned in place and all ends shall be capped or plugged. Remove unused piping and wiring exposed in Equipment Rooms or occupied spaces. Material shall be removed from Project premises. Disconnect power, water, gas, pump or any other active energy source from piping or electrical service prior to abandoning in place.
- D. Existing piping, ductwork, and equipment modified or altered as part of this Work shall comply with the most recent applicable code requirements.

# 3.2 FRAMING, CUTTING AND PATCHING

- A. Special framing, recesses, chases and backing for Work of this Section, unless otherwise specified, are covered under other Specification Sections.
- B. Contractor is responsible for placement of pipe sleeves, hangers, inserts, supports, and location of openings for the Work.
- C. Cutting, patching, and repairing of existing construction to permit installation of equipment, and materials is the responsibility of Contractor. Repair or replace damage to existing work with skilled mechanics for each trade.
- D. Cut existing concrete construction with a concrete saw. Do not utilize pneumatic devices.
- E. Core openings through existing construction for passage of new piping and conduits. Cut holes of minimum diameter to suit size of pipe and associated insulation installed. Coordinate with building structure, and obtain Structural Engineer's approval prior to coring through existing construction.

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#### 3.3 PLUMBING DEMOLITION

- A. Refer to Division 01 Sections "Cutting and Patching" and "Selective Demolition" for general demolition requirements and procedures.
- B. Disconnect, dismantle and remove mechanical systems, equipment, and components indicated to be removed. Coordinate with all other trades.
  - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
  - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping to remain with same or compatible piping material. Refrigerant system must be evacuated per EPA requirements.
  - 3. Equipment to Be Removed: Drain down and cap remaining services and remove equipment.
  - 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
  - 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

# 3.4 ELECTRICAL REQUIREMENTS

- A. Provide adequate working space around electrical equipment in compliance with the California Electrical Code. Coordinate the Mechanical Work with the Electrical Work to comply.
- B. Furnish necessary control diagrams and instructions for the controls. Before permitting operation of any equipment which is furnished, installed, or modified under this Section, review all associated electrical work, including overload protection devices, and assume complete responsibility for the correctness of the electrical connections and protective devices. Motors and control equipment shall conform to the Standards of the National Electrical Manufacturers' Association. All equipment and connections exposed to the weather shall be NEMA IIIR with factory-wired strip heaters in each starter enclosure and temperature control panel where required to inhibit condensation.
- C. All line voltage and low voltage wiring and conduit associated with the Temperature Control System are included in this Section. Wiring and conduit shall comply with Division 26.

# 3.5 PIPING SYSTEM REQUIREMENTS

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A. Drawing plans, schematic and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

# 3.6 PRIMING AND PAINTING

- A. Perform priming and painting on the equipment and materials as specified herein.
- B. See Division 09 Painting Section(s) for detailed requirements.
- C. Priming and Painting:
  - 1. Exposed ferrous metals, including piping, which are not galvanized or factory-finished shall be primed and painted.
    - a. Black Steel Piping:
      - 1) Primer: One coat gray Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, comparable products by Rust-Oleum, Kelly Moore, or equal.
      - 2) Topcoat: Two coats gray Sherwin-Williams Pro Industrial Waterbased Alkyd Urethane Enamel, comparable products by Rust-Oleum, Kelly Moore, or equal.
  - 2. Metal surfaces of items to be jacketed or insulated except piping shall be given two coats of primer unless furnished with equivalent factory finish. Items to be primed shall be properly cleaned by effective means free of rust, dirt, scale, grease and other deleterious matter and then primed with the best available grade of zinc rich primer. After erection or installation, all primed surfaces shall be properly cleaned of any foreign or deleterious matter that might impair proper bonding of subsequent paint coatings. Any abrasion or other damage to the shop or field prime coat shall be properly repaired and touched up with the same material used for the original priming.
  - 3. Where equipment is provided with nameplate data, the nameplate shall be masked off prior to painting. When painting is completed, remove masking material.

# 3.7 PIPING SYSTEMS INSTALLATION

A. At time of final connection, and prior to opening valve to allow pressurization of water and gas piping from existing systems, on site or off site, perform a pressure test to indicate static pressure of existing systems. If pressure on water piping is greater than 80 psi, or gas pressure is not as indicated on Contract Documents, inform Architect immediately. Do not allow piping systems to be pressurized without written consent of the Architect.

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#### B. General:

- 1. All piping shall be concealed unless shown or otherwise directed. Allow sufficient space for ceiling panel removal.
- 2. Installation of piping shall be made with appropriate fittings. Bending of piping will not be accepted.
- 3. Install piping to permit application of insulation and to allow valve servicing.
- 4. Where piping or conduit is left exposed within a room, the same shall be run true to plumb, horizontal, or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.
- 5. Horizontal runs of pipes and/or electrical conduit suspended from ceilings shall provide for a maximum headroom clearance. The clearance shall not be less than 6'-6" without written approval from the Architect.
- 6. Close ends of pipe immediately after installation. Leave closure in place until removal is necessary for completion of installation.
- 7. Each piping system shall be thoroughly flushed and proved clean before connection to equipment.
- 8. Install exposed polished or enameled connections with special care showing no tool marks or threads at fittings.
- 9. Install horizontal valves with valve stem above horizontal.
- 10. Use reducing fittings; bushings shall not be allowed. Use eccentric reducing fittings wherever necessary to provide free drainage of lines and passage of air.
- 11. Verify final equipment locations for roughing-in.
- 12. Furnish and install anchors or thrust blocks on PVC water lines in the ground, at all changes in direction of piping, and at all connections or branches from mains 1-1/2 inch and larger. Form anchors or thrust blocks by pouring concrete between pipe and trench wall. Thrust blocks shall be of adequate size and so placed as to take thrusts created by maximum internal water pressure. Sizing and placement shall be per manufacturer's recommendations, CPC, and IAPMO installation standards. Anchor piping to building construction.
- 13. Sanitary Sewer and Storm Drain: Grade piping inside building uniformly 1/4 inch per foot if possible but not less than 1/8 inch per foot. Run piping as straight as possible. Make piping connections between building piping and outside service pipe with cast iron reducers or

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- increasers. Slope sewers uniformly between given elevations where invert elevations are shown.
- 14. Where piping is installed in walls within one inch of the face of stud, provide a 16 gauge sheet metal shield plate on the face of the stud. The shield plate shall extend a minimum of 1-1/2 inches beyond the outside diameter of the pipe.

# C. Expansion Loops:

- 1. Install expansion loops where piping crosses building expansion or seismic joints, between buildings, between buildings and canopies, and as indicated on Drawings.
- 2. Install expansion loops of sizes matching sizes of connected piping.
- 3. Install grooved-joint expansion joints to grooved-end steel piping.
- 4. Materials of construction and end fitting type shall be consistent with pipe material and type of gas or liquid conveyed by the piping system in which expansion loop is installed.

#### D. Sleeves:

- Install Adjus-to-Crete, Pipeline Seal and Insulator, or equal, pipe sleeves of sufficient size to allow for free motion of pipe, 24 gauge galvanized steel. The space between pipe and sleeves through floor slabs on ground, through outside walls above or below grade, through roof, and other locations as directed shall be caulked with oakum and mastic and made watertight. The space between pipe and sleeve and between sleeve and slab or wall shall be sealed watertight.
- 2. At Contractor's option, Link-Seal, Metraflex Metraseal, or equal, casing seals may be used in lieu of caulking. Wrap pipes through slabs on grade with 1 inch thick fiberglass insulation to completely isolate the pipe from the concrete.

# E. Floor, Wall, and Ceiling Plates:

1. Fit all pipes with or without insulation passing through walls, floors, or ceilings, and all hanger rods penetrating finished ceilings with chrome-plated or stainless escutcheon plates.

# F. Firestopping:

- 1. Pack the annular space between the pipe sleeves and the pipe through all floors and walls with UL listed fire stop, and sealed at the ends. All pipe penetrations shall be UL listed, Hilti, 3M Pro-Set, or equal.
  - a. Install fire caulking behind mechanical services installed within fire rated walls, to maintain continuous rating of wall construction.

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- Provide SpecSeal Systems UL fire rated sleeve/coupling penetrators for each pipe penetration or fixture opening passing through floors, walls, partitions or floor/ceiling assemblies. All Penetrators shall comply with UL Fire Resistance Directory (Latest Edition), and in accordance with Chapter 7, CBC requirements.
- 3. Sleeve penetrators shall have a built in anchor ring for waterproofing and anchoring into concrete pours or use the special fit cored hole penetrator for cored holes.
- 4. Copper and steel piping shall have SpecSeal plugs on both sides of the penetrator to reduce noise and to provide waterproofing.
- 5. All above Systems to be installed in strict accordance with manufacturer's instructions.
- 6. Alternate firestopping systems are acceptable if approved equal. However, any deviation from the above specification requires the Contractor to be responsible for determining the suitability of the proposed products and their intended use, and the Contractor shall assume all risks and liabilities whatsoever in connection therewith.

# G. Flashing:

- 1. Flashing for penetrations of metal or membrane roof for mechanical items such as flues and pipes shall be coordinated with the roofing manufacturer and roofing installer for the specific roofing type. The work of this section shall include furnishing, layout, sizing, and coordination of penetrations required for the mechanical work.
  - a. Furnish and install flashing and counterflashing in strict conformance with the requirements of the roofing manufacturer. Submit shop drawing details for review prior to installation.
  - b. Furnish and install counterflashing above each flashing required. Provide Stoneman, or equal, vandalproof top and flashing combination. Provide vandalproof top for each plumbing vent through roof. Elmdor/Stoneman Model 1540, 1550, 1570, or equal.
- 2. For all other types of roofing system, furnish and install around each pipe, where it passes through roof, a flashing and counterflashing. All flashing shall be made of four pound seamless sheet lead with 6 inch minimum skirt and steel reinforced boot. Counterflashing shall be cast iron. For vents, provide vandalproof top and flashing combination. Elmdor/Stoneman Model 1100-4, 1100-5, 1100-7, or equal.

# H. Hangers and Supports:

1. General: Support equipment and piping so that it is firmly held in place by approved iron hangers and supports and special hangers. Hanger and support components shall support weight of equipment and pipe,

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fluid, and pipe insulation based on spacing between supports with minimum factor of safety of five based on ultimate strength of material used. Do not exceed manufacturer's load rating. Pipe attachments or hangers, of same size as pipe or tubing on which used, or nearest available. Rigidly fasten hose faucets, fixture stops, compressed air outlets, and similar items to the building construction. The Architect shall approve hanger material before installation. Do not support piping with plumbers' tape, wire rope, wood, or other makeshift devices. Where building structural members do not match piping support spacing, provide "bridging" support members firmly attached to building structural members in a fashion approved by the structural engineer.

- a. Materials, design, and type numbers per Manufacturers' Standardization Society (MSS), Standard Practice (SP)-58.
  - 1) Provide copper-plated or felt-lined hangers for use on copper tubing.
- 2. Hanger components shall be provided by one manufacturer: B-Line, Grinnell, Unistrut, Badger, or equal.
- 3. Riser clamps: B-line model B3373, or equal.
- 4. Pipe Hanger and Support Placement and Spacing:
  - a. Vertical piping support spacing: Provide riser clamps for piping, above each floor, in contact with the floor. Provide support at joints, branches, and horizontal offsets. Provide additional support for vertical piping, spaced at or within the following maximum limits:

| Pipe<br>Diameter | Steel Threaded or Welded (Note 3) | Steel<br>Gas                              | Copper<br>Brazed or<br>Soldered<br>(Note 3) | CPVC & PVC (Note 2)                |
|------------------|-----------------------------------|-------------------------------------------|---------------------------------------------|------------------------------------|
| 1/2 - 1"         | 12 ft.                            | 6 ft.                                     | Each Floor,<br>Not to<br>Exceed 10<br>ft.   | Base and<br>Each Floor<br>(Note 1) |
| 1-1/4 - 2"       | 12 ft.                            | Each Floor,<br>Not to<br>Exceed 10<br>ft. | Each Floor,<br>Not to<br>Exceed 10<br>ft    | Base and<br>Each Floor<br>(Note 1) |
| 2-1/2 - 3"       | 12 ft.                            | Each Floor,<br>Not to<br>Exceed 10<br>ft. | Each Floor,<br>Not to<br>Exceed 10<br>ft.   | Base and<br>Each Floor<br>(Note 1) |

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| Over 4" 12 | 2 ft. | Each Floor,<br>Not to<br>Exceed 10<br>ft. | Each Floor,<br>Not to<br>Exceed 10<br>ft. | Base and<br>Each Floor<br>(Note 1) |
|------------|-------|-------------------------------------------|-------------------------------------------|------------------------------------|
|------------|-------|-------------------------------------------|-------------------------------------------|------------------------------------|

- 1) Note 1: Provide mid-story guides.
- Note 2: For PVC piping, provide for expansion every 30 feet per IAPMO installation standard. For CPVC piping, provide for expansion per IAPMO installation standard.
- 3) Note 3: Spacing of hangers and supports for piping assembled with mechanical joints shall be in accordance with standards acceptable to authorities having jurisdiction.
- b. Vertical cast iron piping support spacing: Base and each floor not to exceed 15 feet.
- c. Horizontal piping, hanger and support spacing: Locate hangers and supports at each change of direction, within one foot of elbow, and spaced at or within following maximum limits:

| <u>Pipe</u><br><u>Diameter</u> | Steel Threaded or Welded (Note 2) | <u>Steel</u><br><u>Gas</u> | Copper<br>Brazed or<br>Soldered<br>(Notes 2, 3) | CPVC & PVC (Note 1) |
|--------------------------------|-----------------------------------|----------------------------|-------------------------------------------------|---------------------|
| 1/2 - 1"                       | 6 ft.                             | 6 ft.                      | 5 ft.                                           | 3 ft.               |
| 1-1/4 - 2"                     | 7 ft.                             | 10 ft.                     | 6 ft.                                           | 4 ft.               |
| 2-1/2 - 3"                     | 10 ft.                            | 10 ft.                     | 10 ft.                                          | 4 ft.               |
| Over 4"                        | 10 ft.                            | 10 ft.                     | 10 ft.                                          | 4 ft.               |

- 1) Note 1: For PVC piping, provide for expansion every 30 feet per IAPMO installation standard. For CPVC piping, provide for expansion per IAPMO installation standard.
- 2) Note 2: Spacing of hangers and supports for piping assembled with mechanical joints shall be in accordance with standards acceptable to authorities having jurisdiction.
- 3) Note 3: Includes all refrigerant piping, including vapor and hot gas pipes.
- d. Horizontal cast iron piping support spacing:
  - 1) Support piping at every other joint for piping length of less than 4 feet.

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- 2) For piping longer than 4 feet, provide support on each side of the coupling, within 18 inches of each joint.
- 3) Hanger shall not be installed on the coupling.
- 4) Provide support at each horizontal branch connection.
- 5) Provide sway brace at 40 foot maximum spacing for suspended pipe with no-hub joints, except where a lesser spacing is required by the seismic design criteria used in Seismic Shop Drawing Submittal for seismic systems. Refer to Article, Submittals.
- 6) Provide a brace on each side of a change in direction of 90 degrees or more.

# 5. Suspended Piping:

a. Individually suspended piping: B-Line B3690 J-Hanger or B3100 Clevis, complete with threaded rod, or equal. All hangers on supply and return piping handling heating hot water or steam shall have a swing connector at point of support.

| Pipe Size        | Rod Size Diameter |  |
|------------------|-------------------|--|
| 2" and Smaller   | 3/8"              |  |
| 2-1/2" to 3-1/2" | 1/2"              |  |
| 4" to 5"         | 5/8"              |  |
| 6"               | 3/4"              |  |

- b. Trapeze Suspension: B-Line 1-5/8 inch width channel in accordance with manufacturer's published load ratings. No deflection to exceed 1/180 of a span.
- c. Trapeze Supporting Rods: Shall have a safety factor of five; securely anchor to building structure.
- d. Pipe Clamps and Straps: B-Line B2000, B2400; isolate copper pipe with two thicknesses of 2 inches wide 10-mil polyvinyl tape. Where used for seismic support systems, provide B-Line B2400 series pipe straps.
- e. Steel Connectors: Beam clamps with retainers.

# 6. Support to Structure:

a. Wood Structure: Provide and install wood blocking as required to suit structure. Provide lag screws or through bolts with length to

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suit requirements, and with size (diameter) to match the size of hanger rods required.

 Do not install Lag screws in tension without written review and acceptance by Structural Engineer.

| Side Beam Angle Clip | B-Line B3062MSS Type 34 |  |
|----------------------|-------------------------|--|
| Side Beam Angle Clip | B-Line B3060            |  |
| Ceiling Flange       | B-Line B3199            |  |

- 2) Blocking for support of piping shall be not less than 2 inch thick for piping up to 2 inch size. Provide 3 inch blocking for piping up through 5 inch size, and 4 inch blocking for larger piping. Provide support for blocking in accordance with Structural Engineers requirements.
- Where lag screws are used, length of screw shall be 1/2 inch less than the wood blocking. Pre-drill starter holes for each lag screw.
- b. Steel Structure: Provide and install additional steel bracing as required to suit structure. Provide through bolts with length to suit requirements of the structural components. Burning or welding on any structural member may only be done if approved by the Architect.
- 7. Rubber Neoprene Pipe Isolators:
  - a. Pipe isolators shall comprise an internal rubber or neoprene material that isolates pipe from hanger and structure. Install at all piping located in acoustical walls. Refer to Architectural Drawings for location of acoustical walls.
  - b. Isolation material shall be either a rubber or neoprene material that prevents contact between the pipe and the structure. The rubber shall have between a 45 to 55 durometer rating and a minimum thickness of 1/2 inch.
  - c. Acceptable Suppliers:
    - 1) Vertical runs: Acousto-Plumb or equal.
    - 2) Horizontal runs: B-Line, Vibraclamp; Acousto-Plumb or equal.
- 8. Provide support for piping through roof, arranged to anchor piping solidly in place at the roof penetration.

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- 9. Provide rigid insulation and a 12 inch long, 18 gauge galvanized sheet iron shield between the covering and the hanger whenever hangers are installed on the outside of the pipe covering.
- 10. Insulate copper tubing from ferrous materials and hangers with two thicknesses of 3 inch wide, 10 mil polyvinyl tape wrapped around pipe.
- 11. Provide a support or hanger close to each change of direction of pipe either horizontal or vertical and as near as possible to concentrated loads.
- Suspend rods from concrete inserts with removable nuts where suspended from concrete decks. Power actuated inserts will not be allowed.

# 3.8 UNION AND FLANGE INSTALLATION

- A. Install Watts, Epco, Nibco, or equal, dielectric unions or flanges at points of connection between copper or brass piping or material and steel or cast iron pipe or material except in drain, waste, vent, or rainwater piping. Bushings or couplings shall not be used. Dielectric unions installed in potable water systems shall conform to the lead-free requirements of the California Health and Safety Code Section 11 68 75.
- B. Install unions in piping NPS 2" and smaller, and flanges in piping NPS 2-1/2" and larger whether shown or not at each connection to all equipment and tanks, and at all connections to all automatic valves, such as temperature control valves. Unions installed in potable water systems shall conform to the lead-free requirements of the California Health and Safety Code Section 11 68 75.
- C. Locate the unions for easy removal of the equipment, tank, or valve.

# 3.9 ACCESS DOOR INSTALLATION

A. Furnish and install access doors wherever required whether shown or not for easy maintenance of mechanical systems; for example, at concealed valves, strainers, traps, cleanouts, dampers, motors, controls, operating equipment, etc. Access doors shall provide for complete removal and replacement of equipment.

# 3.10 PIPE IDENTIFICATION

- A. Provide temporary identification of each pipe installed, at the time of installation. Temporary identification shall be removed and replaced with permanent identification as part of the work.
- B. Apply the legend and flow arrow at all valve locations; at all points where the piping enters or leaves a wall, partition, cluster of piping or similar obstruction, at each change of direction and at approximately 20'-0" intervals on pipe runs. Variations or changes in locations and spacing may be made with the approval of the Architect. There shall be at least one marking in each room.

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- Markings shall be located for maximum visibility from expected personnel approach.
- C. Wherever two or more pipes run parallel, the markings shall be supplied in the same relative location on each.
- D. Apply markings after painting and cleaning of piping and insulation is completed.

# 3.11 EXPANSION ANCHORS IN HARDENED CONCRETE

A. Refer to Structural Drawings.

# 3.12 PIPING SYSTEM PRESSURE TESTING

## A. General:

- Perform operational tests under simulated or actual service conditions, including one test of complete plumbing installation with fixtures and other appliances connected.
- 2. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
- B. Piping Systems: Test piping systems in accordance with the following requirements and applicable codes:
  - 1. Authority having jurisdiction shall witness tests of piping systems.
  - 2. Notify Architect at least seven days in advance of testing.
  - 3. All piping shall be tested at completion of roughing-in, or at other times as directed by Architect.
  - 4. Furnish necessary materials, test pumps, gases, instruments and labor required for testing.
  - 5. Isolate from system equipment that may be damaged by test pressure.
- C. Test Schedule: No loss in pressure or visible leaks shall show after four hours at the pressures indicated.
- D. Testing of Sanitary Sewer, Drain, Vent, and Storm Drain may be done in segments in order to limit pressure to within manufacturer's recommendations. Test to 10 feet above highest point in the system.

| System Tested                  | Test Pressure PSI | Test With |
|--------------------------------|-------------------|-----------|
| Sanitary Sewer, Drain, Vent    | 10 Ft. Hd.        | Water     |
| Storm Drain, Condensate Drains | 10 Ft. Hd.        | Water     |

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| Domestic Water      | 125     | Water                                  |
|---------------------|---------|----------------------------------------|
| Natural Gas (PE)    | 60      | Air & Non-corrosive<br>Leak Test Fluid |
| Natural Gas (Steel) | 100     | Air & Non-corrosive<br>Leak Test Fluid |
| Compressed Air      | 200 lb. | Air & Non-corrosive<br>Leak Test Fluid |
| Deionized Water     | 50      | Water                                  |

- 1. Flush deionized water lines with deionized water after test and approval.
- 2. Non-corrosive leak test fluid shall be suitable for use with piping material specified, and with the type of gas conveyed by the piping system.

# 3.13 OPERATION OF SYSTEMS

- A. Do not operate any plumbing equipment for any purpose, temporary or permanent, until all of the following has been completed:
  - 1. Complete all requirements listed under "Check, Test and Start Requirements."
  - 2. Piping has been properly cleaned. Piping systems shall be flushed and treated prior to operation.
  - 3. Filters, strainers etc. are in place.
  - 4. Bearings have been lubricated, and alignment of rotating equipment has been checked.
  - 5. Equipment has been run under observation, and is operating in a satisfactory manner.
- B. Provide test and balance agency with one set of Contract Drawings, Specifications, Addenda, Change orders issued, applicable shop drawings and submittals and temperature control drawings.

## 3.14 CHECK, TEST AND START REQUIREMENTS

A. An authorized representative of the equipment manufacturer shall perform check, test and start of each piece of plumbing equipment. The representative may be an employee of the equipment manufacturer, or a manufacturer-certified contractor. Submit written certification from the manufacturer stating that the representative is qualified to perform the check test and start of the equipment.

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- 1. As part of the submittal process, provide a copy of each manufacturer's printed startup form to be used.
- 2. Some items of specified equipment may require that check, test and start of equipment must be performed by the manufacturer, using manufacturer's employees. See specific equipment Articles in these Specifications for this requirement.
- 3. Provide all personnel, test instruments, and equipment to properly perform the check, test and start work.
- 4. When work has been completed, provide copies of reports for review, prior to final observation of work.
- B. Provide copies of the completed check, test and start report of each item of equipment, bound with the Operation and Maintenance Manual.
- C. Upon completion of the work, provide a schedule of planned maintenance for each piece of equipment. Indicate frequency of service, recommended spare parts (including filters and lubricants), and methods for adjustment and alignment of all equipment components. Provide a copy of the schedule with each operating and maintenance manual. Provide a copy of certification from the Owner's representative indicating that they have been properly instructed in maintenance requirements for the equipment installed.

## 3.15 PRELIMINARY OPERATIONAL REQUIREMENTS AND TESTS

- A. Prior to observation to determine final acceptance, put all mechanical systems into service and check that work required for that purpose has been done, including but not limited to the following condensed check list. Provide indexed report to tabulating the results of all work.
  - 1. All equipment has been started, checked, lubricated and adjusted in accordance with the manufacturer's recommendations.
  - 2. Correct rotation of motors and ratings of overload heaters are verified.
  - 3. Specified filters are installed and spare filters have been turned over to Owner.
  - 4. All manufacturers' certificates of start-up specified have been delivered to the Owner.
  - 5. All equipment has been cleaned, and damaged painted finishes touched up.
  - 6. Missing or damaged parts have been replaced.
  - 7. Flushing and chemical treatment of piping systems has been completed and water treatment equipment, where specified, is in operation.

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- 8. Equipment labels, pipe marker labels, ceiling markers and valve tags are installed.
- 9. Valve tag schedules, corrected control diagrams, sequence of operation lists and start-stop instructions have been posted.
- 10. Preliminary test and balance work is complete, and reports have been forwarded for review.
- 11. Automatic control set points are as designated and performance of controls checks out to agree with the sequence of operation.
- 12. Operation and Maintenance Manuals have been delivered and instructions to the operating personnel have been made.
- B. Prior to the observation to determine final acceptance, operate all mechanical systems as required to demonstrate that the installation and performance of these systems conform to the requirements of these specifications.
  - 1. Operate and test all mechanical equipment and systems for a period of at least five consecutive 8 hour days to demonstrate the satisfactory overall operation of the project as a complete unit.
  - 2. Commence tests after preliminary balancing and adjustments to equipment have been checked. Immediately before starting tests, install air filters and lubricate all running equipment. Notify the Architect at least seven calendar days in advance of starting the above tests.
  - 3. During the test period, make final adjustments and balancing of equipment, systems controls, and circuits so that all are placed in first class operating condition.
  - 4. Where Utility District rebates are applicable, demonstrate that the systems meet the rebate program requirements.

# C. Review of Contractor's Tests:

 All tests made by the Contractor or manufacturers' representatives are subject to observation and review by the Owner. Provide timely notice prior to start of each test, in order to allow for observation of testing. Upon the completion of all tests, provide a letter to confirm that all testing has been successful.

# D. Test Logs:

- Maintain test logs listing the tests on all mechanical systems showing dates, items tested, inspectors' names, remarks on success or failure of the tests.
- E. Preliminary Operation:

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1. The Owner reserves the right to operate portions of the plumbing system on a preliminary basis without voiding the guarantee.

# 3.16 CERTIFICATES OF INSTALLATION

A. Contractor shall complete applicable "Certificates of Installation" forms contained in the California Building Energy Efficiency Standards and submit to the authorities having jurisdiction for approval and issuance of final occupancy permit, as described in the California Energy Code.

#### 3.17 DEMONSTRATION AND TRAINING

- A. An authorized representative of the equipment manufacturer shall train Owner-designated personnel in maintenance and adjustment of equipment. The representative may be an employee of the equipment manufacturer, or a manufacturer-certified contractor. Submit written certification from the manufacturer stating that the representative is qualified to perform the Owner training for the equipment installed.
  - 1. As part of the submittal process, provide a training agenda outlining major topics and time allowed for each topic.
  - 2. Some items of specified equipment require that training must be performed by the manufacturer, using manufacturer's employees. See specific equipment Articles in these Specifications for this requirement.
  - Contractor shall provide three copies of certification by Contractor that training has been completed, signed by Owner's representative, for inclusion in Operation and Maintenance Manual. Certificates shall include:
    - a. Listing of Owner-designated personnel completing training, by name and title.
    - b. Name and title of training instructor.
    - c. Date(s) of training.
    - d. List of topics covered in training sessions.
  - 4. Refer to specific equipment Articles for minimum training period duration for each piece of equipment.

# **END OF SECTION**

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# SECTION 22 10 00 PLUMBING PIPING SYSTEMS

# **PART 1 - GENERAL**

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Pipe and fittings.
  - 2. Domestic Water Piping Specialties.
  - Drain and Waste Piping Specialties.

## 1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 22 00 50 Basic Plumbing Materials and Methods.

# 1.3 ACTION SUBMITTALS

- A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.
- B. Product Data: Submit manufacturer's technical product data and installation instructions for plumbing piping systems materials and products.

## 1.4 INFORMATIONAL SUBMITTALS

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

## 1.5 CLOSEOUT SUBMITTALS

- A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.
- B. Maintenance Data: Submit maintenance data and parts lists for plumbing piping systems materials and products. Include this data in Operation and Maintenance Manual.

# 1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish to Owner, with receipt, one valve key for each key operated hydrant, bibb, or faucet installed.

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## 1.7 QUALITY ASSURANCE

A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.

# **PART 2 - PRODUCTS**

# 2.1 MATERIALS AND PRODUCTS

- A. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Provide materials and products complying with California Plumbing Code. Where more than one type of material or product is indicated, selection from materials or products specified is Contractor's option.
- B. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Plastic piping components shall be marked with "NSF-pw."

# 2.2 PIPE AND FITTINGS ATTACHED TO AND BELOW BUILDINGS INCLUDING 5 FEET FROM BUILDINGS

- A. Piping and fittings attached to covered walkways and corridors shall comply with the requirements of this article.
- B. Drain and Waste Pipe Above Grade: Cast iron soil pipe and fittings, asphaltic coated, conforming to ASTM A888 and Cast Iron Soil Pipe Institute Standard (CISPI) 301 and so marked. Pipe and fittings shall be as manufactured by AB&I, Charlotte, Tyler Pipe, or equal. Pipe and fittings shall be the products of a single manufacturer. At Contractor's option, vertical piping above floor from lavatories, sinks, and drinking fountains may be Schedule 40 galvanized steel pipe with black cast iron drainage fittings, or DWV weld pipe and fittings.
  - Joints above grade: No-Hub pipe conforming to ASTM A888 and CISPI 301. Couplings conforming to ASTM 1277 and CISPI 310, with stainless steel bands. Provide products by ANACO-Husky, Tyler, Ideal or equal. Provide sway brace at 20'-0" maximum spacing for suspended pipe with No-Hub joints. Provide a brace on each side of a change in direction of 90 degrees or more. Brace riser joints at each floor and at 15 foot maximum intervals (also see Specification Section 22 00 50).
    - a. OSHPD Projects: Provide sway brace at each joint per CBC.
- C. Drain and Waste Pipe Below Grade: Cast iron soil pipe and fittings, asphaltic coated, conforming to ASTM A888 and CISPI 301 and so marked. Pipe and fittings shall be as manufactured by AB&I, Charlotte, Tyler Pipe, or equal. Pipe and fittings shall be the products of a single manufacturer. At Contractor's option, hub and spigot cast iron soil pipe and fittings, asphaltic coated, conforming to ASTM A-74 and so marked, may be used.

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- 1. Joints below grade: ANACO-Husky SD 4000, Clamp-All 125, or equal couplings and No-Hub fittings, meeting the requirements of FM 1680, SD Class I and ASTM C1540.
- Joints below grade (hub and spigot option): Neoprene gaskets conforming to ASTM C564, as manufactured by Ty-Seal, Dual-Tite, or equal.

# D. Vent Pipe:

- 3 inch and larger: Cast iron soil pipe and fittings conforming to ASTM A888 and Cast Iron Soil Pipe Institute Standard 301 and so marked. Joints in cast iron vent pipe shall be the same as specified for cast iron waste pipe above grade.
- 2-1/2 inch and smaller: Cast iron soil pipe and fittings as specified for sizes 3 inch and larger, Schedule 40 galvanized steel pipe with black cast iron drainage fittings, or DWV copper pipe and fittings.
- 3. Vent pipe buried in ground and to 6 inches above ground: Cast iron soil pipe and fittings conforming to ASTM A888 and Cast Iron Soil Pipe Institute Standard 301 and so marked. Joints in cast iron vent pipe shall be the same as specified for cast iron waste pipe below ground.
- E. Water Pipe (Tempered Water, Tempered Water Return, Hot Water, Hot Water Return and Cold Water): ASTM B88, Type L copper tubing, hard-temper, with wrought copper fittings. Provide full solder cup for all fittings. Capped or plugged outlets shall be Schedule 40 screwed brass. Water piping below slab: ASTM B88, Type K copper tubing, hard temper, with wrought copper fittings. At Contractor's option, pipe runs below slab having no branches may be ASTM B88, Type K annealed copper tubing without joints. See Section 22 00 50 for pipe protection requirements for below slab copper piping.

# F. Condensate Drain Piping:

- Inside buildings provide ASTM B88, Type L copper tubing and fittings. Provide Wye fittings with capped cleanout plug for tubing up to 1 inch size. Provide wrought or cast DWV fittings for sizes 1-1/4 inch and larger.
- Outside buildings provide ASTM B88, Type L copper pipe and fittings, cast iron drain pipe and fittings or Schedule 40 galvanized steel pipe and cast iron drain or vent fittings.
- 3. Connect condensate drains to mechanical equipment per equipment manufacturer's recommendations; provide P-trap where required. Slope piping to drain, with 1 inch in 10 foot minimum pitch. Provide di-electric couplings or unions at connections to dissimilar materials.
- 4. Where Drawings indicate installation of mechanical equipment on spring isolation rails spring mounted curbs, or spring hangers, provide threaded metal connector at mechanical equipment, Metraflex Model

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- SST, or equal by Unisource Mfg. Co., or Flexicraft Industries. Arrange flexible connection to ensure drainage of condensate, and support flexible connection at each end of connector, to ensure proper alignment.
- 5. Where condensate drain P-traps are required, install trap using Wye fitting on inlet and outlet of trap. Provide cap on top of each Wye, made removable for cleaning and inspection. Drill 1/8 inch diameter hole in cap at outlet of the trap to allow venting of the system. Minimum depth of trap should be 4 inches, or as recommended by the manufacturer in printed literature.
- 6. Provide cleanout tees or "Y" at each change in direction.
- 7. Insulate condensate drain piping above ceilings and within building with 1 inch thick fiberglass, minimum 3.5 pounds per cubic foot density, with ASJ-SSL jacket.

## 2.3 PIPE JOINING MATERIALS

- A. Refer to piping Articles in this Section for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated
    - a. Full-Face Type: For flat-face, Class 125, cast iron and cast bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast iron and steel flanges.
  - 2. AWWA C111, rubber, flat face, 1/8-inch (3.2mm) thick, unless otherwise indicated; and full-face or ring type, unless other indicated.
  - 3. Flange Bolts and Nuts: AWWA C111, carbon steel, unless otherwise indicated.
  - 4. Plastic, Pipe-Flange Gasket, Bolts and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, 100 percent lead free alloys. Include water-flushable flux according to ASTM B813.
- D. Brazing Filler Metals: AWS A5.8, BCup-5 Series, copper-phosphorus unless otherwise indicated. Sil-Fos 15, or equal.

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#### 2.4 VALVES AND FITTINGS FOR POTABLE WATER SYSTEMS

# A. General:

- 1. Provide valves and fittings conforming to lead-free requirements of California Health and Safety Code Section 11 68 75.
  - a. Provide valves listed to NSF/ANSI 61-G or NSF/ANSI 372 for valve materials for potable-water service.
    - 1) Exception: Main distribution gate valves above 1-1/2 inches located underground outside building are not required to conform lead-free requirements of California Health and Safety Code Section 11 68 75.

#### B. Ball Valves:

- 2 inches and smaller: 600 psi CWP, cast bronze or brass body, full port, two piece, threaded ends, and reinforced PTFE seal, conforming to MSS SP-110. Nibco T-685-80-LF, Milwaukee UPBA400, Apollo 77C-LF10, Kitz 868, or equal.
- 2. 2-1/2 inches: Apollo 77C-LF10, or equal.

# 2.5 DRAIN AND WASTE PIPING SPECIALTIES

## A. Cleanouts:

- General: Install cleanouts of same diameter as pipe (4 inch maximum) in all horizontal soil and waste lines where indicated and at all points of change in direction. Cleanouts shall be located not less than 18 inches from building construction so as to provide sufficient space for rodding. No horizontal run over 50 feet inside buildings or 100 feet outside buildings shall be without cleanout, whether shown on Drawings or not. Provide two-way cleanouts where indicated on drawings, and where required for satisfactory use.
  - a. Provide cleanouts in waste drop from each sink and urinal.
  - b. Provide one wrench for each size and type of cleanout used. Turn over to Owner at completion of the project, and obtain receipt. Place receipt in Operation and Maintenance Manuals.
- Cleanouts in floor and in concrete sidewalks: Ducco Cast Iron with nickel bronze top, clamping collar and ABS plastic plug: Zurn ZN-1400-KC, or equal, with square or round top to suit floor construction.
- 3. Cleanouts in composition floors: Zurn ZN-1400-X-DX, or equal (nickel bronze top).
- 4. Cleanouts in concealed, aboveground cast-iron soil or waste lines: Zurn Z-1440A, or equal, with ABS plastic plug.

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- 5. Cleanouts in walls: Zurn Z-1441 or Z-1443, or equal, with stainless steel cover. Provide long sweep elbow or combination wye at connection to riser and install with surface of cleanout within ½ inch of front face of finished wall.
  - a. Where space does not permit the above installation, provide Zurn Z-1446, or equal, with stainless steel access cover, and vandal resistant screw.
  - b. Install face of cleanout plug within 1/2 inch of front face of finished wall.

# **PART 3 - EXECUTION**

#### 3.1 EXAMINATION

- A. Examine areas and conditions under which plumbing piping systems are to be installed. Do not proceed with Work until unsatisfactory conditions have been corrected in manner acceptable to Contractor.
- B. Make all arrangements for the utilities required. Pay all costs involved in obtaining the services including gas service and meter, water meter, pressure reducing valve, access boxes, street work. Connect to site utilities. Verify the location of all services. No extra cost will be allowed if services are not as shown.
- C. At time of final connection, and prior to opening valve to allow pressurization of water and gas piping from existing systems, on site or off site, perform a pressure test to indicate static pressure of existing systems. If pressure on water piping is greater than 80 psi, or gas pressure is not as indicated on Contract Documents, inform Architect immediately. Do not allow piping systems to be pressurized without written consent of the Architect.

# 3.2 INSTALLATION OF WATER PIPING

- A. Run all water piping generally level, free of traps or unnecessary bends, arranged to conform to the building requirements, and to suit clearance for other mechanical work such as ducts, flues, conduits, and other work. No piping shall be installed so as to cause unusual noise from the flow of water therein under normal conditions.
- B. Provide manufactured water hammer arrestors, sized and installed in accordance with Plumbing and Drainage Institute Standard PDI WH201.
  - 1. Locate water hammer arrestors at every plumbing fixture, or, where fixtures are located in groups, at every group of fixtures, and as indicated on Drawings.
  - 2. Install water hammer arresters above accessible ceilings, or install access doors for service.

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- C. In freezing locations arrange water piping to drain as shown.
- D. Install piping on room side of building insulation.
- E. Check final location of rubber rings within couplings on PVC water piping with gauge or as recommended by manufacturer. Make connection to valves with cast iron adapters connected to water pipe with cast iron couplings. Furnish and install anchors or thrust blocks.

## 3.3 INSTALLATION OF SANITARY AND STORM DRAINAGE SYSTEMS

- A. Make joints in PVC sewer pipe with PVC-type couplings and rubber rings.
- B. Check final location of rubber rings within the couplings with gauge or as recommended by the manufacturer. Make joints between PVC pipe and cast iron pipe or fittings using cast iron adapter fittings, installed as recommended by the manufacturer.
  - Ring-Tite cast iron pipe fittings may be used in lieu of standard fittings.
     Make connection to valves with cast iron adapters connected to the pipe with PVC couplings.
- C. Sewer Piping: Run all horizontal sanitary drain piping inside of building on a uniform grade of not less than 1/4 inch per foot unless otherwise noted or later approved. Unless otherwise noted on the plans, piping shall have invert elevations as shown and slope uniformly between given elevations.
- D. Storm Drain Piping: Run all horizontal storm drain piping inside of building on a uniform grade of not less than 1/4 inch per foot. Unless otherwise noted on the plans, piping shall have invert elevations as shown and slope uniformly between given elevations.
- E. Run all drainage piping as straight as possible and provide easy bends with long turns; make all offsets at an angle of 45 degrees or less.
- F. Grade all vent piping so as to free itself guickly of any water condensation.
- G. Where possible, join groups of vent risers together with one enlarged outlet through roof. Maintain minimum of 10 foot horizontal or 3 foot vertical clearance from air intakes.
- H. Install drip pan under storm drain piping, sanitary drain piping, and vent piping that must be run over kitchen areas.
- I. Hubless Cast Iron Joints: Comply with coupling manufacturer's installation instructions.

# 3.4 PIPE JOINTS AND CONNECTIONS

#### A. General:

1. Cutting: Cut pipe and tubing square, remove rough edges or burrs. Bevel plain ends of steel pipe.

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- 2. Remove scale, slag, dirt and debris from inside and outside of pipe before assembly.
- 3. Boss or saddle type fittings or mechanically extracted tube joints will not be allowed.
- B. Threaded Pipe: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply thread compound to external pipe threads: Rectorseal No. 5, Permatex No. 1, or equal.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- C. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- D. Copper Pipe and Tubing (Except pneumatic control piping): All joints shall be brazed according to ASME Section IX, Welding and Brazing Qualifications, except domestic water piping 1-1/4 inches and smaller when not buried in the ground or concrete and type DWV plumbing piping may be soldered.
  - 1. Soldered joints: Apply water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828.

# E. Cast Iron Soil Pipe:

- 1. No-Hub fittings shall be made with a torque wrench.
- 2. Hub joints shall be with Ty-Seal couplings.
- 3. Wrought iron, steel, or copper pipe shall have a ring or part of a coupling screwed on to form a spigot end if caulked into a joint.
- 4. Connect cast iron sewer piping to outside service pipe with cast iron or vitrified LOP reducers or increasers as required. Caulking of smaller pipe into the larger without a reducer or increaser will not be permitted.

# F. Flexible Connections:

- 1. Furnish and install Thermo Tech., Inc. F/J/R, Metraflex, or equal, flexible couplings with limiter bolts on piping connections to all equipment mounted on anti-vibration bases, on each connection to each base mounted pump and where shown. Couplings shall be suitable for pressure and type of service.
- 2. Anchor piping securely on the system side of each flexible connection.

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#### 3.5 INSTALLATION OF VALVES

- A. Install valves as indicated on Drawings and in the following locations:
  - 1. Shutoff Valves: Install on inlet of each plumbing equipment item, and on inlet of each plumbing fixture, and elsewhere as indicated.
  - 2. Drain Valves: Install on each plumbing equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere indicated or required to completely drain potable water system.
  - 3. Provide gate or globe valves on inlet and outlet of each water heater or pump.

#### B. General:

- 1. Valves shall be full line size unless indicated otherwise on Drawings.
- 2. Install horizontal valves with valve stem above horizontal, except butterfly valves.
- 3. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- 4. Locate valves for easy access and provide separate support where necessary.
- 5. Install valves in position to allow full stem movement.
- 6. Install exposed polished or enameled connections with special care showing no tool marks or exposed threads.
- 7. Butterfly valves conforming to the paragraph "Butterfly Valves" may be used in lieu of gate or globe valves for locations above grade.
- 8. Ball valves conforming to the paragraph "Ball Valves" may be used in lieu of gate valves for locations above grade for services 2-1/2 inches and smaller.
- 9. Valves 2-1/2 inches and smaller (except ball valves) in nonferrous water piping systems may be solder joint type with bronze body and trim.
- 10. Rigidly fasten hose bibbs, hydrants, fixture stops, compressed air outlets, and similar items to the building construction.

# 3.6 INSTALLATION OF CLEANOUTS

A. Cleanouts: Install in piping as indicated, as required by California Plumbing Code, at each change in direction of piping greater than 45 degrees. Install at maximum intervals of 50 feet for piping 4 inches and smaller and 100 feet for larger piping inside buildings, and at base of each conductor.

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B. Flashing Flanges: Install flashing flange and clamping device with each cleanout passing through water resistant membrane.

# 3.7 DOMESTIC WATER SYSTEM STERILIZATION

- A. Clean and disinfect new or altered hot and cold water piping connected to domestic water systems using methods prescribed by the Health Authority. If the Health Authority does not prescribe methods, clean and disinfect new or altered hot and cold water piping using methods given in the California Plumbing Code.
  - 1. A water treatment company that has a current state EPA license to apply disinfectant chlorine in potable water shall perform the procedure.

# 3.8 EQUIPMENT CONNECTIONS

- A. Piping Runouts to Fixtures: Provide hot and cold water piping runouts to fixtures of sizes indicated.
- B. Mechanical Equipment Connections: Connect hot and cold water piping system and gas piping system to mechanical equipment as indicated, and provide with shutoff valve and union for each connection.

# 3.9 CARE AND CLEANING

A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim that are installed as part of this work. Remove labels from stainless steel sinks, except 316 stainless steel sink labels should be retained to confirm that the correct material has been provided. Leave systems and equipment in satisfactory operating condition.

# 3.10 OPERATIONAL TESTS

A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

# 3.11 TESTING AND BALANCING

A. See Section 23 05 93 of Specifications for testing and balancing requirements.

# 3.12 CLEANING UP

A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

## **END OF SECTION**

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#### **SECTION 22 40 00**

## **PLUMBING FIXTURES**

#### **PART 1 - GENERAL**

# 1.01 SUMMARY

- A. Section Includes:
  - 1. Water supplies and stops.
  - 2. Plumbing fixture hangers and supports.

## 1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 22 00 50 Basic Plumbing Materials and Methods.

# 1.03 ACTION SUBMITTALS

- For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.
- B. Product Data: Submit manufacturer's specifications for plumbing fixtures and trim, including catalog cut of each fixture type and trim item furnished.

# 1.04 INFORMATIONAL SUBMITTALS

A. Refer to Section 22 00 50, Basic Plumbing Materials and Methods.

# 1.05 CLOSEOUT SUBMITTALS

- A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.
- B. Maintenance Data: Submit maintenance data and parts lists for each fixture type and trim item, including instructions for care of finishes. Include this data in Operation and Maintenance Manual.

# 1.06 QUALITY ASSURANCE

- A. For additional requirements, refer to Section 22 00 50, Basic Plumbing Materials and Methods.
- B. Plumbing Fixture Standards: Comply with applicable portions of the following codes and requirements for all work in this Section:
  - 1. California Building Code CBC

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- 2. California Plumbing Code CPC
- California Health and Safety Code
- American National Standards Institute ANSI
- 5. Federal Standards F.S.
- 6. National Sanitary Foundation NSF International
- C. ANSI Standards: Comply with ANSI/NSF 61, "Drinking Water System Components Health Effects."
- D. PDI Compliance: Comply with standards established by Plumbing and Drainage Institute pertaining to plumbing fixture supports.
- E. Americans with Disabilities Act (ADA).
- F. California Green Building Standards Code Requirements:
  - 1. Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Tank-Type Toilets.
  - 2. Single Showerheads shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Showerheads.

# **PART 2 - PRODUCTS**

# 2.01 PLUMBING FIXTURES

- A. General: Provide factory fabricated fixtures of type, style and material indicated. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats, and valves as indicated by their published product information; either as designed and constructed, or as recommended by the manufacturer, and as required for a complete, installation. Where more than one type is dedicated, selection is Contractor's option; but, all fixtures of same type must be furnished by single manufacturer.
  - 1. Take special care with the roughing-in and finished plumbing where batteries of fixtures occur.
  - 2. Take location and mounting heights for roughing-in from Architectural Drawings.
  - Follow schedule on Plumbing Drawings for roughing-in connections. Set roughing-in for all fixtures exactly as per measurements furnished by the manufacturers of the fixtures used.
  - 4. Roughing-in for lavatories and sinks shall be brought in through the wall under the centerline of the drain from the fixture wherever possible and as close to the fixture as possible.

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# 2.02 MATERIALS

- A. Provide materials that have been selected for their surface flatness and smoothness. Exposed surfaces that exhibit pitting, seam marks, roller marks, foundry sand holes, stains, discoloration, or other surface imperfections on finished units are not acceptable.
- B. Where fittings, trim and accessories are exposed or semi-exposed, provide, chromium plated 17 gauge seamless brass and match faucets and fittings. Provide 17 gauge seamless copper or brass where not exposed.
- C. Handles on all faucets and stops shall be all metal chromium plated.
- D. NSF Standard: Comply with NSF 61 and NSF 372 for supply-fitting materials that will be in contact with potable water.

# 2.03 PLUMBING FITTINGS, TRIM AND ACCESSORIES

- A. Water Outlets: At locations where water is supplied (by manual, automatic or remote control), provide commercial quality faucets, valves, or dispensing devices, of type and size indicated, and as required to operate as indicated.
  - 1. Include manual shutoff valves and connecting stem pipes to permit outlet servicing without shut-down of water supply piping systems.
- B. P-Traps: Include IAPMO approved removable P-traps where drains are indicated for direct connection to drainage system. P-Traps shall be less trap screw cleanout, and incorporate a chrome plated cast brass body, brass connection nuts, 17 gauge seamless brass wall return and chrome plated wall escutcheon to match trap finish.
- C. Carriers: Provide cast iron supports for fixtures of graphitic gray iron, ductile iron, or malleable iron as indicated. Where the carrier for wall mounted water closets are installed more than 6 inches behind the finished wall, provide water closet support for wide pipe chase.
- D. Fixture Bolt Caps: Provide manufacturer's standard exposed fixture bolt caps finished to match fixture finish.
- E. Escutcheons: Where fixture supplies and drains penetrate walls in exposed location, provide chrome-plated cast brass escutcheons with setscrews.
- F. Aerators: Provide aerators of types approved by Health Departments having jurisdiction. Delete aerators where not allowed by CPC for health care occupancies.
- G. Comply with additional fixture requirements contained in Fixture Schedule shown on the drawings.

# 2.04 MANUFACTURERS

A. In accordance with California Plumbing Code, provide indelibly marked or embossed manufacturers name or logo, arranged so as to be visible after installation.

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- B. Manufacturers: Drawing schedules indicate Basis of Design products. Subject to compliance with requirements, provide product indicated on Drawings, or comparable product by one of the following:
  - 1. Vitrified China Plumbing Fixtures:
    - a. American Standard, U.S. Plumbing Products.
    - b. Eljer Plumbingware Div., Wallace-Murray Corp.
    - c. Kohler Co.
    - d. VitrA.
  - 2. Plumbing Trim:
    - a. McGuire Manufacturing Co., Inc.
    - b. Delta Commercial.
    - c. Chicago Faucet Co.
    - d. T&S Brass and Bronze Works, Inc.
  - 3. Flush Valves:
    - a. Sloan Valve Co.
    - b. Zurn Industries, Hydromechanics Div.
    - c. Toto USA, Inc.
  - Faucets:
    - a. Chicago Faucet Co.
    - b. Symmons Scott.
    - c. T&S Brass and Bronze Works, Inc.
    - d. Delta Commercial.
  - 5. Fixture Seats:
    - a. Church Seat Co.
    - b. Bernis Mfg. Co.
    - c. Beneke Corp.
  - 6. Fixture Carriers:
    - a. Josam Mfg. Co.
    - b. J. R. Smith.
    - c. Tyler Pipe; Wade Div.

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- d. Zurn Industries; Hydromechanics Div.
- e. Mifab, Inc.

# 2.05 FLUSH VALVE REQUIREMENTS

A. Metering flush valves where required and specified shall be non-hold open type with exposed parts chrome plated. Conform to all codes and manufacturers' recommendations. All diaphragms are to have multiple filtered bypass and be chloramine resistant synthetic rubber with internal components suitable for I80 degree hot water to I50 pounds pressure, plastic or leather diaphragm not acceptable.

# 2.06 FIXTURE CONNECTIONS

- A. Make connection between fixtures and flanges on soil pipe absolutely gastight and watertight with neoprene type gaskets (wall hung fixtures) or bowl wax (floor outlet fixtures). Rubber gaskets or putty will not be permitted.
- B. Provide fixtures not having integral traps with P-traps of chromium-plated 17 gauge cast brass, with 17 gauge seamless brass wall return, connected to concealed waste in wall and sanitary fittings. Provide IAPMO approval for trap, and provide less trap screw cleanout.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
    - a. Dearborn Brass, Commercial series with brass nuts.
    - b. Delta Commercial.
    - c. McGuire Manufacturing Co., Inc.
- C. Connections from stacks or horizontal wastes to wall or floor finish for wastes from lavatories, urinals, sinks, and drinking fountains and connection between floor drains and traps shall be IPS 85 percent red brass pipe.
- D. Plumbing fixture traps connected to special waste systems shall be constructed of materials to suit the waste system.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
    - a. Orion.
    - b. Enfield
- E. Unions on waste pipes on fixture side of traps may be slip or flange joints with soft rubber or lead gaskets. Traps shall rough in full size to waste and vent connection, using deep escutcheon plate to cover wall penetration. Compression adaptor extensions or sweat adaptors are not acceptable.

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# 2.07 WATER SUPPLIES AND STOPS

- A. Provide 85 percent IPS threaded red brass nipple, conforming to the lead-free requirements of California Health and Safety Code Section 11 68 75, securely anchored to building construction, for each connection to stops, hose bibbs, etc. Each fixture, except hose bibbs, shall have stop valves installed on water supply lines.
- B. Provide water supplies to fixtures with compression shut-off stops with threaded inlets and lock shield-loose key handles. Provide combination fixtures with compression stop and threaded inlet on each water supply fitting. Provide lock shield-loose key handle for each stop.
- C. Provide 1/2 inch riser tubes with reducing coupling for fixtures, unless otherwise noted.
- D. Provide cast brass escutcheon.
- E. Furnish shut-off valves on hose bibbs where directly connected to mains with no intervening valves.
- F. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
  - 1. McGuire Manufacturing Company, Inc., model LFH2167LK.
  - 2. T & S Brass and Bronze Works, Inc., model B-1305.

#### 2.08 PLUMBING FIXTURE HANGERS AND SUPPORTS

- A. Floor-affixed supports for off-the-floor plumbing fixtures shall comply with ASME A112.6.1M.
- B. Residential type fixture supports are not acceptable.
- C. Install wall mounted water closets with combination support and waste fittings, with feet of support securely anchored to floor.
- D. Install floor mounted water closets with J.R. Smith, Zurn, or equal government pattern cast iron closet flanges with brass bolts, nuts, washers, and porcelain caps secured with Spackle.
- E. Install the following fixtures on concealed support with feet of support securely anchored to floor. Anchor top of support to wall construction in an approved manner.
  - 1. Wall hung lavatories.

# 2.09 PLUMBING FIXTURES

A. Install all plumbing fixtures at height indicated on Architectural Drawings. Where mounting height is not indicated, install at height required by Code.

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- B. Special Requirements For Accessible Fixtures:
  - 1. Operating handle or valve for accessible water closets, urinals, lavatories, and sinks shall operate with less than 5 pounds force. Metering faucets shall be adjusted to operate between 10 and 15 seconds.
  - 2. Insulate exposed waste piping and domestic water supplies below accessible fixtures with CBC access code compliant molded "closed-cell" vinyl covers. Covers shall be installed using vandal resistant fasteners and must be removable. Covers shall meet flame spread rating not to exceed 25 and smoke density not to exceed 50 when tested in accordance with ASTM E-84, and shall comply with the requirements of California Code of Regulations, Title 24. Plumberex Handy Shield, Johns Manville Zeston 2000, or equal.

# **PART 3 - EXECUTION**

# 3.01 PRODUCT HANDLING AND PROTECTION

A. Deliver packaged materials in their original, unopened wrapping with labels intact. Protect materials from water, the elements and other damage during delivery, storage and handling.

## 3.02 PREPARATORY PROVISIONS

A. The Contractor is responsible for the examination and acceptance of all conditions affecting the proper construction and/or installation of the Work of this Section. Do not proceed until all unsatisfactory conditions have been corrected. Commencing work will be construed as acceptance of all conditions by the Contractor as satisfactory for the construction and/or installation of the Work.

## 3.03 INSPECTION AND PREPARATION

- A. Examine roughing-in work of domestic water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping, and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of the National Standard Plumbing Code pertaining to installation of plumbing fixtures.
- C. Fasten plumbing fixtures securely to supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies to blocking behind or within wall construction so as to be rigid, and not subject to pull or push movement.
- D. Install CBC accessible fixtures in accordance with Chapter 4 California Plumbing Code, and Chapters 11A and 11B California Building Code.

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## 3.04 FAUCET INSTALLATION

- A. Provide 85 percent IPS red brass pipe, conforming to lead-free requirements of California Health and Safety Code Section 11 68 75, securely anchored to building construction, for each connection to faucets, stops, hose bibbs, etc. Each fixture, except hose bibbs, shall have a stop valve installed on water supply lines to permit repairs without shutting off water mains.
- B. Adjust metering faucets to run for 10 to 15 seconds.

# 3.05 CLEAN AND PROTECT

- A. Clean plumbing fixtures of dirt and debris upon completion of installation.
- B. Protect installed fixtures from damage during the remainder of the construction period.
- C. Grout voids between all fixtures and adjacent surfaces with white Dow Silicone Sealant, arranged to shed water.

## 3.06 FIELD QUALITY CONTROL

A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

## 3.07 EXTRA STOCK

A. General: Furnish special wrenches and other devices necessary for servicing plumbing fixtures and trim to Owner with receipt. Furnish one device for every ten units.

#### **END OF SECTION**

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